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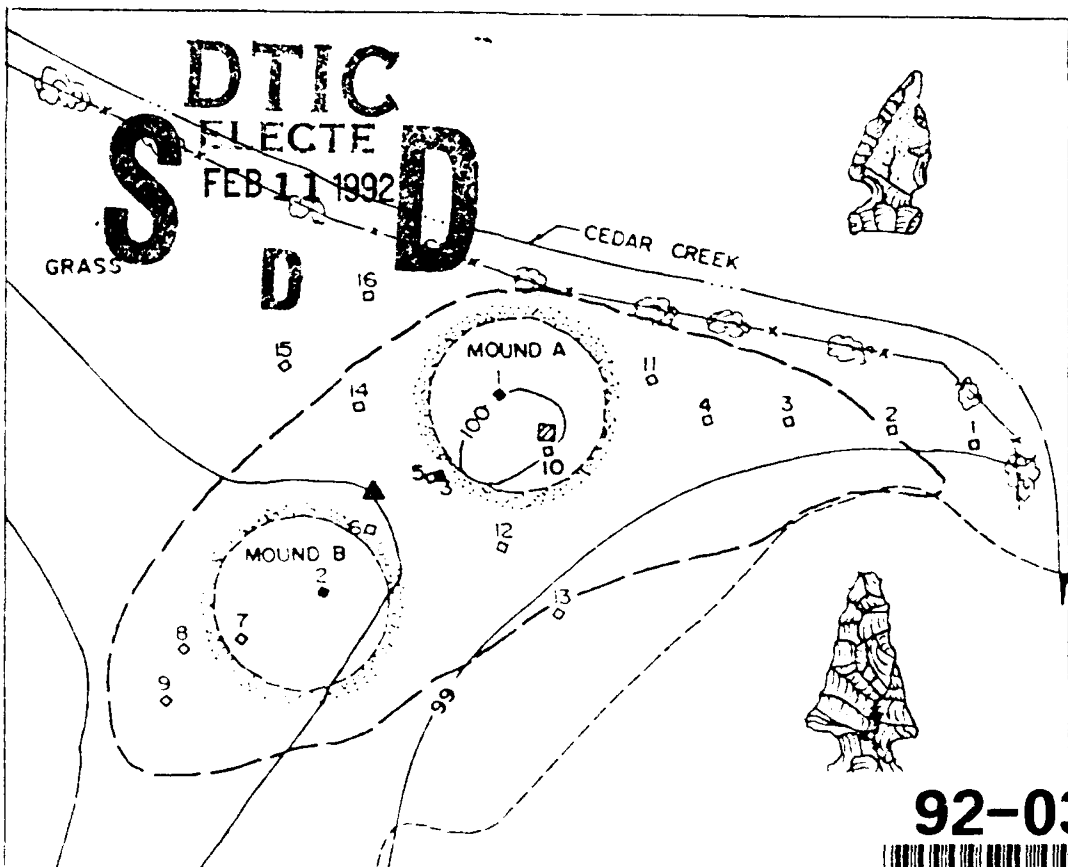

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The Bowies Branch site, though disturbed to some extent by plowing, still contains subplowzone deposits with evidence of a lodge of the Plains Village period, as well as abundant ceramic and lithic artifacts. The variety of pottery wares recovered reflects interaction of Pomona and Central Plains Tradition groups in the study area.

ARCHAEOLOGICAL INVESTIGATIONS
IN THE PERRY LAKE PROJECT AREA, NORTHEASTERN KANSAS
NATIONAL REGISTER EVALUATION OF 17 SITES

Edited by

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Michael Fosha
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Junction City, Kansas
Parkville, Missouri

December 1989

Funds for this investigation and report were provided by the U.S. Army Corps of Engineers. The Corps may not necessarily agree with the contents of this report in its entirety. The report reflects the professional views of the Contractor who is responsible for collection of the data, analysis, conclusions and recommendations.

The study performed herein by the Contractor for the Corps of Engineers is called for in the National Historic Preservation Act of 1966 (PL 89-665) as amended by Public Laws 94-422 and 96-515 and is authorized for funding under Public Law 86-523 as amended by Public Law 93-291. Accomplishment of this work provides documentation evidencing compliance with Executive Order 11593 "Protection and Enhancement of the Cultural Environment" dated 13 May 1971, and Section 110 of the National Historic Preservation Act.

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The Bowies Branch site, though disturbed to some extent by plowing, still contains subplowzone deposits with evidence of a lodge of the Plains Village period, as well as abundant ceramic and lithic artifacts. The variety of pottery wares recovered reflects interaction of Pomona and Central Plains Tradition groups in the study area.

Abstract

This report describes archaeological investigations at 17 sites in the Perry Lake Project Area, Jefferson County, Kansas. The investigations were undertaken in order to determine the eligibility of the sites for the National Register of Historic Places. The project was funded by the Kansas City District, U.S. Army Corps of Engineers and conducted by Kaw Valley Engineering and Development, Inc. The project entailed site testing to determine the integrity and significance of cultural deposits. Sites investigated include: 14JF38, 14JF103, 14JF105, Cut-Bank (14JF409), 14JF410, Senn's Hill (14JF414), 14JF417, Quixote (14JF420), 14JF421, Bowies Branch (14JF423), 14JF447, Reichart (14JF448 and 14JF449), 14JF450, 14JF477, 14JF482, and 14JF484. Two sites listed in the original contract for NRHP testing and evaluation were exchanged for sites 14JF420 and 14JF423. Site 14JF497 has been subjected to extensive erosion by wave action and still requires preliminary professional survey to determine if testing is required. This site was exchanged for 14JF420. Site 14JF348 has also not received sufficient preliminary professional evaluation to determine if NRHP testing is required. It was exchanged for 14JF423, which is located in its immediate vicinity.

Field investigations of sites included surface survey and piece plotting of diagnostic artifacts and formal tools to determine horizontal site boundaries, topographic mapping, inspection of stream banks for buried cultural materials, manual excavation of test pits to determine depth and integrity of cultural deposits, and coring with a mobile earth drill and backhoe excavation of deep trenches to test for buried site components and to collect soil-geomorphic data. Laboratory analysis involved sorting and cataloging all recovered materials for curation and analysis of lithic, ceramic, historic and biological assemblages, as well as submission of organic samples for radiocarbon analyses in order to date cultural and soil-geomorphic phenomena.

The results of the field and laboratory procedures have resulted in the following conclusions: the sites span the last 8,000 years of human history in the Delaware River basin, including the Archaic, Plains Woodland, Plains Village and Historic periods; soil-geomorphic investigations have outlined a model of valley landscape evolution which indicates potential for buried Paleoindian and Archaic sites; 12 of the sites either do not possess sufficient cultural deposits or lack the stratigraphic integrity to warrant consideration for the National Register of Historic Places; five sites (Cut-Bank, Quixote, Reichart, which includes two independently recorded, adjacent mounds, and Bowies Branch) contain cultural materials of potential significance for understanding the Archaic, Plains Woodland, and Plains Village periods in the study area.

The Cut-Bank site contains a disturbed surface component of Late Archaic and/or Plains Woodland affiliation and two buried components of the Early and Middle Archaic periods. The latter components are deemed worthy of consideration for the National Register. Both are buried by two to four meters of alluvium and separated from each other by a geomorphic discontinuity. The younger of the components has yielded lithic artifacts diagnostic of the Munkers Creek phase of the Middle Archaic period and a hearth feature which has been radiocarbon dated to 5710±100 B.P. The older component has yielded lithic artifacts, bone and a hearth feature radiocarbon dated to 8220±350 B.P. Both components are presently the only tested sites of the Archaic period in the study area and the oldest absolutely dated occupations in the Delaware River basin. They promise to provide future investigators with valuable insights into poorly understood adaptations of hunter-gatherers in northeastern Kansas to the Altithermal climatic episode.

The Quixote and Reichart sites consist of earth mounds with deep (at least 60 cm) cultural deposits that have never been disturbed by plowing. Both are single component sites assigned to the Grasshopper Falls phase of the Plains Woodland period. The former consists of two such mounds in pasture, one of which has received minor disturbance by construction of a windmill. Both yielded an abundance of artifacts including ceramics, chipped stone tools and lithic debris, burned limestone and fire-cracked quartzite, and faunal material. The latter also includes two mounds, albiet in woodland, that contain a comparable cultural assemblage. One of the mounds (14JF448) at the Reichart site also contains a thick horizon of daub, remains of a thatch covered structure. Previously excavated sites of this phase have been disturbed by modern agriculture. Future excavation of these relatively intact sites will provide new information about the Plains Woodland lifeways in the study area.

The Bowies Branch site, though relatively small and disturbed to some extent by plowing, still contains at least 20 cm of subplowzone deposits that include extensive evidence of at least one earth lodge of the Plains Village period. Excavation yielded an abundance of daub, as well as ceramic and lithic artifacts. Testing also revealed a soil stratigraphy that promises to facilitate future discovery of undisturbed structural features (e.g., postmolds, storage pits, etc.). The variety of pottery wares recovered reflects interaction of Pomona and Central Plains Tradition groups in the study area. Future study of this site will result in a better understanding of the relationship among contemporaneous Plains Village cultures in northeastern Kansas.

A C K N O W L E D G M E N T

The Perry Lake Archaeological Project entailed the cooperation of many people, including several who labored mightily to excavate some of the most unyielding clays known to humankind during the summer drought of 1988. Michael Fosha served as Field Director and the following persons worked as excavators: Steve Bozarth, Todd Clawson, Ted Craig, Tim Gillen, Aaron Longenecker, Byron Loosle, Ernie McFeeters, Jim Mendenhall, Shayne Moss, Milton Reichart and Heather Wright.

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Brad Logan, Principal Investigator
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Chapter 1

THE PERRY LAKE ARCHAEOLOGICAL PROJECT: PURPOSE, RESEARCH GOALS AND BACKGROUND

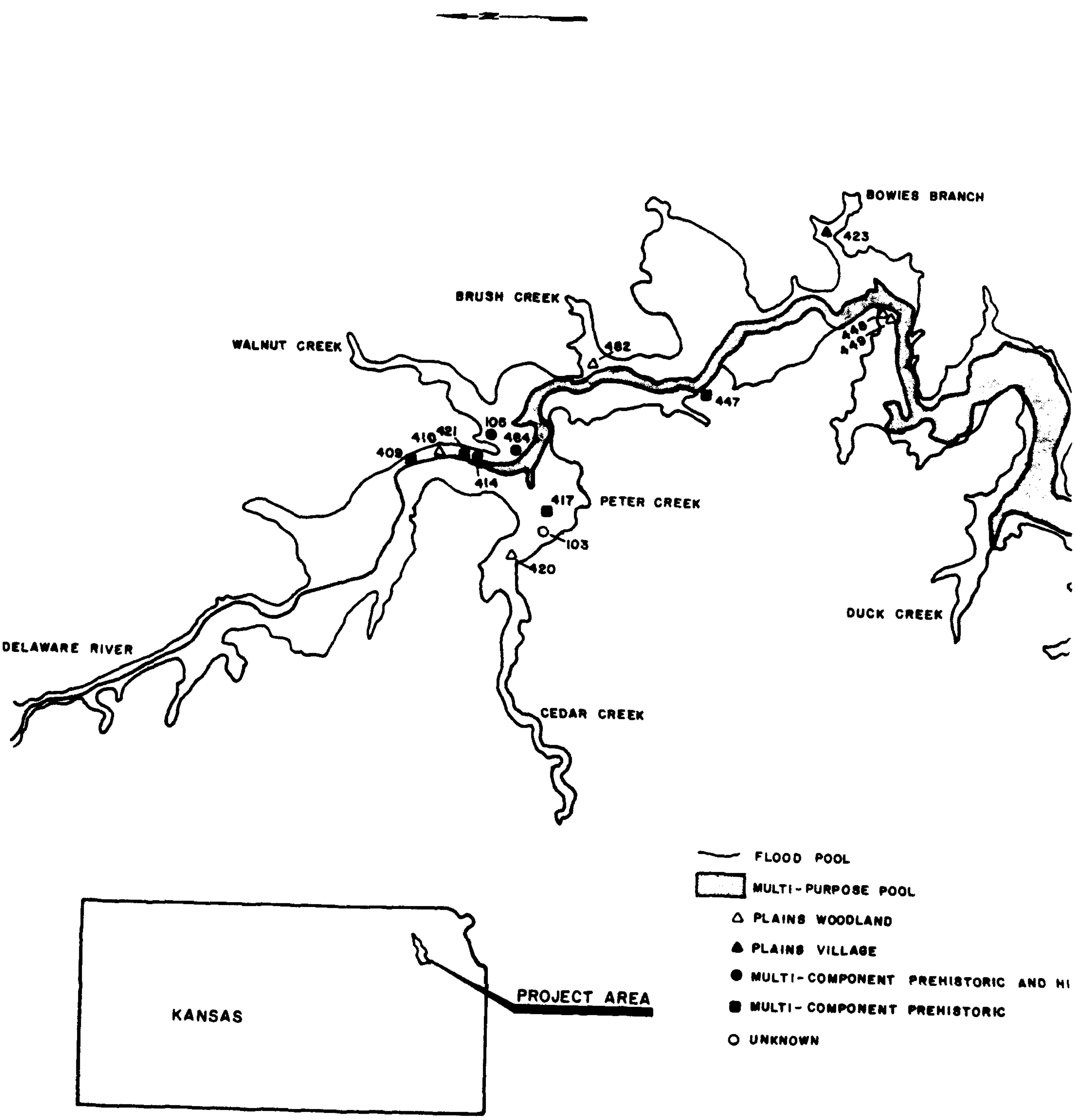
Brad Logan

Introduction

This is a report of archaeological investigations at 17 sites in the Perry Lake Project Area, northeastern Kansas. These sites were selected by the Kansas City District, U.S. Army Corps of Engineers for evaluation of their potential eligibility for the National Register of Historic Places. The Kansas City District entered into a contractual agreement with Kaw Valley Engineering and Development of Junction City, Kansas for the investigation and evaluation of these sites. The project scope of work called for documentation and test excavation of the sites. In June 1988, Kaw Valley Engineering and Development submitted the required research design for the project and fieldwork commenced in July of that year. Test excavations were completed in October and geomorphic fieldwork occurred in October and December. The project was designed in accordance with the standards established by the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation.

Perry Lake, a flood-control project created by Perry Dam, is located on the Delaware River in Jefferson County, Kansas (Fig. 1.1). The Delaware River basin drains an area of 1,144 mi^2 in Nemaha, Brown and Jefferson counties, Kansas. Perry Lake controls flooding of 1,117 mi^2 of the basin. The dam, authorized by Congress in 1954, was constructed from 1961 to 1967. The lake multipurpose pool inundates about 24 miles of the lower Delaware River valley (from near the town of Perry to Valley Falls) and portions of its tributaries, Big Slough Creek, Little Slough Creek and Rock Creek. Perry Lake, at multipurpose pool level, has an elevation of 891.5 feet amsl and a surface area of about 12,200 acres. At maximum flood pool the surface area of the lake would be at an elevation of 920.6 feet amsl and have a surface area of about 25,000 acres. At full flood pool the lake would extend a distance of about 31.5 miles up the Delaware valley from the dam.

A recent inventory and survey of the archaeological resources in the Perry Lake Project Area noted that it contains 215 sites (Schmits 1987). The 17 sites selected for this project (Fig. 1.1) are listed in Table 1.1. These sites do not include 14JF348 and 14JF497, which were among those specified for evaluation in the original scope of work. During a reconnaissance of the project area in July 1988 under the guidance of Mr Milton Reichart, a local avocational archaeologist who has recorded many of the sites in the Perry



BOWIES BRANCH
423
BRUSH CREEK
WALNUT CREEK
462
448
449
447
106
421
416
464
409
414
417
PETER CREEK
103
420
DUCK CREEK
DELAWARE RIVER
CEDAR CREEK
FLOOD POOL
MULTI-PURPOSE POOL
PLAINS WOODLAND
PLAINS VILLAGE
MULTI-COMPONENT PREHISTORIC AND HI
MULTI-COMPONENT PREHISTORIC
UNKNOWN
KANSAS
PROJECT AREA

(1)

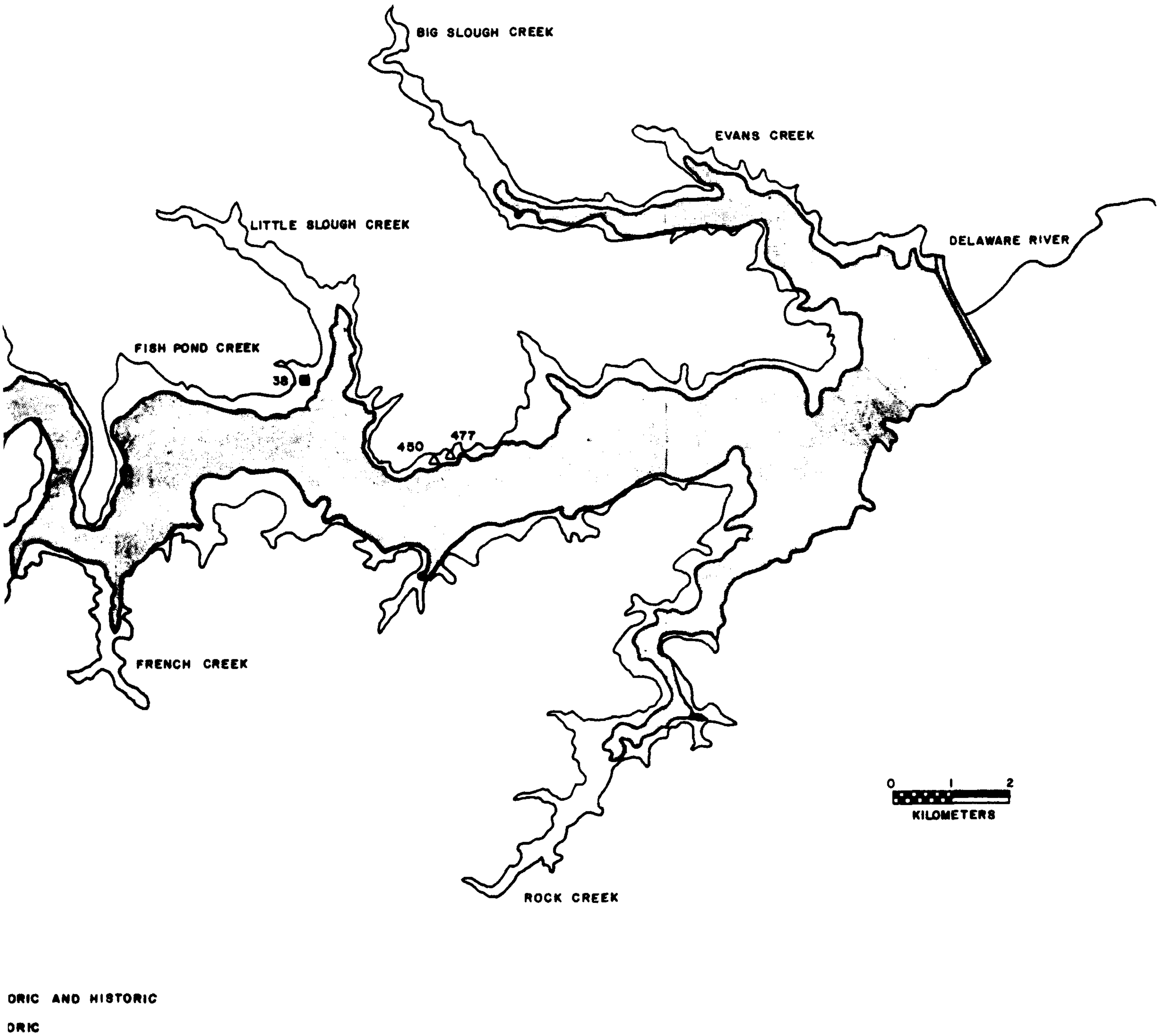


Figure 1.1. Location of sites investigated during the Perry Lake Archaeological Project in 1988.

(2)

Table 1.1 Sites investigated during the Perry Lake Archaeological Project, 1988.

Site No. (Name)	Cultural Affiliation	Associated Stream
14JF38	Plains Woodland, Plains Village	Little Slough Creek
14JF103	Unknown	Cedar Creek
14JF105	Late Archaic, Plains Village, Historic	Delaware River
14JF409 (Cut-Bank)	Early Archaic, Middle Archaic (Munkers Creek phase), Late Archaic and/or Plains Woodland	Delaware River
14JF410	Plains Woodland	Delaware River
14JF414 (Senn's Hill)	Late Archaic (?), Grasshopper Falls phase Plains Village, Historic	Delaware River
14JF417	Late Archaic (?), Plains Woodland	Peter Creek
14JF420 (Quixote)	Grasshopper Falls phase	Cedar Creek
14JF421	Plains Woodland, Plains Village	Delaware River
14JF423 (Bowies Branch)	Plains Village	Bowies Branch
14JF447	Late Archaic, Plains Woodland	Delaware River
14JF448/449 (Reichart)	Grasshopper Falls phase	Delaware River
14JF450	Grasshopper Falls phase	Delaware River
14JF477	Grasshopper Falls phase	Delaware River
14JF482	Grasshopper Falls phase	Delaware River
14JF484	Plains Woodland, Historic	Walnut Creek tributary

Lake area (including most of those considered in this report, see chapter 6), we discovered that these sites did not warrant testing when compared to two others in the Perry Lake area, Quixote (14JF420) and Bowies Branch (14JF423). Although these latter sites had not been included in the scope of work, limited sub-surface investigations by Reichart at 14JF420 and by both Reichart and Environmental Systems Analysis at 14JF423 had suggested both contained potentially significant deposits in undisturbed contexts. On August 17, 1988 Kaw Valley Engineering requested that the Corps of Engineers modify the contract in order to exchange these sites for 14JF348 and 14JF497. This request was granted by the contractor on September 22, 1988.

The following sections of this chapter include a discussion of the research goals of the project, a summary description of the previous archaeological investigations in the Project Area, and a description of the organization of this report.

Research Goals

The following are some of the research problems that were addressed during the Perry Lake Archaeological Project. They relate to broad, general aspects of Great Plains archaeological research and to some more specific topics of interest concerning the nature of prehistoric, archaeological resources in northeastern Kansas. These topics are culture history, site function (i.e., activities) with regard to artifact typology, lithic resource procurement, and settlement patterns. These study domains are, of course, interrelated and are addressed separately only for the convenience and clarity of data presentation.

Culture History: Stochastic change plays a role in culture process. One example of this kind of process is the changes in ceramic decoration that provide us with one means of relative temporal control in the identification of site components. However, culture history is primarily understood as an adaptive process, characterized either by the adjustment of human populations to changes in their physical and social environment that occur through time, or by the maintenance of stability under more static conditions. In order to achieve an understanding of the causes underlying cultural processes of change, we must operate from a reliable and relatively complete cultural chronology. The current state of our knowledge of the culture history of the study area is described in its regional context in chapter 4 of this report. Data recovered from the 17 investigated sites are interpreted from a culture-historical perspective in order to augment our current knowledge of this chronology. Excavations were also undertaken with the aim of identifying, confirming or revising the previously suggested cultural affiliations of the selected sites.

Site Function: If we are to successfully interpret the settlement patterns of past peoples, a good measure of their means of adaptation to their environment, we must not only know the chronological placement of individual sites, we must also understand the particular function, or role, of these sites with respect to each other. For example, were some sites inhabited primarily for purposes of obtaining the raw materials needed for manufacture of chipped stone tools or for obtaining foodstuffs? Interpretations of the variety of activities that occurred at each of the investigated sites must be considered tentative in the light of the fact that the recovered assemblages are the result of limited surface collections and test excavations. Nonetheless, a general

impression of the nature of activities that took place can be obtained from a review of the functional nature of some artifacts, features, and structures.

For example, some activities and the evidence from which they are inferred are: 1) food processing and storage (pottery, cache pits), 2) animal procurement (both game hunting and mussel collection) and processing of game (projectile points, knives, animal remains), 3) scraping of wood or hide (scrapers, notches, and other unifacially retouched flakes), 4) lithic tool production and/or maintenance (debitage and cores), 5) woodworking (axes, celts, abraders), 6) plant food processing (grinding stones), 7) use of fire for cooking or heat (hearths, hearthstones, burned earth), 8) occupation of structures (daub, postmolds), and 9) social interaction (trade goods or status items, evidence of mortuary practices).

Lithic Resource Procurement: The human prehistory of North America is about stone-age peoples. It is not surprising then that archaeologists concerned with these peoples pay much attention to the activities involved in the stages of production of chipped stone and groundstone tools in order to understand them. As the problem domains discussed above make clear, many of our interpretations about culture history and site activities stem from functional and temporal inferences based upon the examination of stone tools. Similarly, if we are to understand the settlement behavior of stone-age societies, we must determine the extent to which the nature and location of the raw materials of lithic tool production and the means of procuring these materials influenced the way they distributed themselves on the landscape. In the next chapter, the types and relative abundances of various stone resources in the study area are discussed and in chapter 7, the use of these resources is described.

Settlement Patterns: The patterned distribution of sites on the landscape reflects the nature of past human adaptations. Human populations distribute themselves (i.e., their settlements) with regard to those resources necessary for their survival. These resources not only include lithic materials but also the plants and animals utilized for food, clothing, and shelter. The correlation between site distributions and resources, as well as changes in the nature or extent of resources and corresponding changes in site distributions, can lead to hypotheses about past human adaptations and the causes underlying culture change. Sites or site networks that provide information concerning past settlement patterns can be considered significant in terms of their eligibility for the National Register of Historic Places.

Important to an accurate grasp of past settlement patterns in a riverine setting, such as the Delaware River basin, is an understanding of those fluvial processes of landscape evolution that may have effected site preservation through floodplain aggradation (site burial), down-cutting (sites preserved on terraces), or lateral planantion (site erosion). Post-occupation processes such as these may sometimes be extensive enough to modify the perceived distribution of sites (e.g., Thompson and Bettis 1980, 1981; Bettis and Thompson 1981; Bettis and Benn 1984; Turnbaugh 1977, 1978). Moreover, the relationship between past societies and their physical environment would have been affected by the nature of the landscape at the time of site occupation. For these reasons, the Perry Lake Archaeological Project included a geomorphic component (see chapter 3).

Previous Investigations

Professional archaeological investigations in the Perry Lake Project Area began with a survey by the Kansas State Historical Society in 1962 and 1963 (Witty 1964). That project resulted in the recording of 35 archaeological sites of which 33 occur in the project area. Ten of these sites were recommended for excavation, 16 for testing and three for follow-up survey. Following its survey, the Kansas State Historical Society devoted two seasons (1965 and 1967) to intensive excavations at a number of sites in the northern part of the project area under contract with the National Park Service (Marshall and Witty 1968). Four sites, Keen, Kroll, Nettye Busby and Melon Patch, were investigated in 1965 (Witty 1983). Data from the Keen and Kroll sites were the subject of a Master's thesis concerning the Pomona variant by Nickel (1973). Sites excavated in 1967 consisted of three Plains Woodland occupations, the Malm, Teaford, and Anderson sites (Marshall 1967; Reynolds 1978). Data from these sites were used by Reynolds (1979) as the basis for definition of a distinctive local expression of that period, the Grasshopper Falls phase.

In the southern portion of the Perry Lake project area, surveys were conducted in 1965 along Big Slough and Evans Creeks, major tributaries of the Delaware River, by the University of Kansas under contract with the National Park Service (Jones 1968). Although more than 36 sites were subjected to surface collections, heavy rain during the season of fieldwork limited subsurface investigations to seven sites, 14JF4, 14JF9, 14JF11, 14JF19, 14JF44, 14JF58, and 14JF64. One of the sites recorded by KU that year and limited to surface collection is 14JF38, which was tested under the present contract between Kaw Valley Engineering and the Kansas City District, U.S. Army Corps of Engineers. In the same year, the Smithsonian Institution excavated three burial mound sites (14JF22, 14JF26, and 14JF337) located on a

bluff on the western edge of Perry Dam (Bass, McWilliams and Jones 1967). Two of the mounds had been extensively disturbed and investigation failed to reveal any cultural material. A burned bone, possibly human, was found in the fill from 14JF26. The third mound, however, had not been previously disturbed and excavation revealed two human burials under a layer of limestone and fill. The skeletal remains included one individual that had been interred in primary, flexed position and then covered with limestone slabs. Brush had then been laid over the burial and fired. Burning did not affect the remains but did scorch the soil around it. A second individual was apparently subjected to partial cremation by the firing of the brush and the remains of this person were then covered with additional pieces of limestone and fragments of bison bone (Bass, McWilliams and Jones 1967). Unfortunately, no associated artifacts that could have provided a cultural-temporal affiliation were discovered in the mound.

In 1972 and 1973, Milton Reichart (1974a), an amateur archaeologist with accreditation from the Kansas State Historical Society, conducted a survey along Cedar Creek on the western shore of Perry Lake near Valley Falls. He recorded 42 sites, recommended excavation of 11 which he believed contained evidence of undisturbed subsurface deposits, testing of 17 sites, and no further investigation of the balance of 14 sites. Reichart (1974a) identified one Archaic component, 29 Woodland components, and one Plains Village component. Eleven sites could not be assigned any cultural affiliation.

A subsequent survey in the Perry Lake area by Reichart (1972) resulted in the recovery of a Plainview point from a gravel bar. Other reconnaissance activity by Reichart (1974b, 1985) north of the Perry Lake project area in the Delaware River basin has led to the recovery of Meserve points, indicative of either late Paleoindian or Early Archaic occupation. Other evidence of Archaic period occupation discovered by Reichart (1984) includes a Munkers Creek knife found in alluvial deposits along the bank of the Delaware River at a depth of four meters. Some of Reichart's surveys have included periodic inspection of the Cut-Bank site (14JF409), which was tested under the current contract. The results of his investigations there are discussed under the heading of that site in chapter six.

Archaeological reconnaissance surveys were conducted by the Kansas State Historical Society along three road improvement right-of-ways in the Perry Lake project area for the U.S. Army Corps of Engineers in 1976 and 1978 (Jones 1976, 1978). Survey along the first of these road improvement routes resulted in the discovery of one previously unrecorded site southeast of Perry Dam. Survey along the second route, along the western side of Perry Lake

from Rock Creek valley to Highway 92, failed to reveal any cultural resources (Jones 1976).

The Kansas City District, U.S. Army Corps of Engineers contracted with Iroquois Research Institute in 1977 in order to inventory all previously recorded cultural resources in the Perry Lake project area. Other tasks undertaken as part of this project included a summation of all previous investigations, a literature search and compilation of the history of the project area, and an inspection of 12 percent of the previously recorded archaeological sites in the Perry Lake area (Iroquois Research Institute 1977). The resulting management plan consists of recommendations for all recorded sites in the project area, completion of an inventory of its cultural resources, guidelines for the management of those resources and plans for the development of public interpretive exhibits. The plan called for a complete shoreline survey of the perimeter of Perry Lake, a distance of 110 miles, and special focus on previously uninventoried areas.

The implementation of the management plan outlined by Iroquois Research Institute entailed a survey of 20 miles of shoreline by the Kansas State Historical Society in 1979. As a result of this sample survey, ten previously unrecorded sites were documented and four previously recorded sites were reinvestigated. Of these sites, eleven were assigned to the Grasshopper Falls phase and one site was suggested to have two components (Grasshopper Falls phase and Plains Village). Extensive shoreline erosion had occurred at most of these sites. Consequently, recommendations were made for testing of two sites (14JF34 and 14JF320), excavation of another (14JF361), follow-up survey of the two-component site (14JF366) and no action at the remaining sites (Witty 1982a).

The most recent archaeological investigations at the Perry Lake project area were conducted by Environmental Systems Analysis, Inc. of Shawnee Mission, Kansas for the Kansas City District, U.S. Army Corps of Engineers (Schmits 1987). This project entailed an inventory of 2500 acres of the project lands, National Register evaluation of the three sites recommended for testing or excavation by the Kansas State Historical Society, and compilation of a history of the project area. None of the three tested sites was considered eligible for the National Register of Historic Places (Schmits 1987). Surveys resulted in the collection of data from 30 previously recorded sites and the discovery of 23 new sites. These sites were identified as containing the following components: Plains Archaic (5), Plains Woodland (21), Plains Village (6), and Historic Euro-American (35). National Register testing was recommended for 18 sites, including eight of the sites investigated under the present contract between the U.S. Army Corps of Engineers and Kaw Valley Engineering (i.e., 14JF38, 14JF103, 14JF105, 14JF414, 14JF417, 14JF450, 14JF477, and 14JF484).

Report Organization

Chapters 2 through 4 of this report contain background information essential to interpretation of the data recovered from the sites investigated during the project. The environmental context of the study area is described in chapter 2. In chapter 3, the geomorphology of the area is discussed. These two chapters provide crucial information for later discussions of prehistoric settlement patterns and lithic procurement practices. In chapter 4, the culture history of the study area is discussed in the context of the history of the broader region of northeastern Kansas and northwestern Missouri. This region was selected because it shares a common cultural heritage with the Perry Lake area and archaeological investigations in it provide the basis for a more detailed picture of the history of the study area. Moreover, the data outlined in that chapter provide a comparitive base for analysis of data recovered from the investigated sites.

Chapters 5 through 9 contain information on the methods of investigation and the results of their application to the 17 sites. General methods of investigation, including field techniques and laboratory procedures, are described in chapter 5. Chapter 6 contains detailed descriptions of each site, its previous investigations, specific methods of investigation, assemblage composition, and brief recommendations concerning its National Register eligibility. Site assemblages are described in more detail in chapters 7 through 9. Lithic artifacts, including tools and the by-products of their manufacture, are the subject of chapter 7. Lithic resource procurement and the preference for certain types of local raw materials for tool production are topics addressed in that section of the report. Ceramic artifacts are described in chapter 8, particularly as they provide information concerning the cultural affiliation of the sites from which they were recovered. Analyses of biological data are the subject of chapter 9. These include discussions of botanical materials (both macrofloral and opal phytolith) and faunal remains.

Finally, chapter 10 summarizes the information from the previous chapters and weighs it in terms of its potential for providing significant insights to the prehistory of the study area, particularly with regard to the specific research goals of this project. On that basis, recommendations for the National Register eligibility of each site are provided. Pertinent data on some artifact assemblages are presented in appendices to the report.

Chapter 2

THE ENVIRONMENTAL CONTEXT

Brad Logan

In the following discussion of the physical environment of the study area, significant changes during the Quaternary Epoch are described. In particular, Late Pleistocene and Holocene climatic fluctuations and attendant changes in the composition of prairie-forest communities and their associated faunas are emphasized. It is suggested that the participation of groups of hunter-gatherers and hunter-gatherer-gardeners in such a dynamic ecosystem may have been characterized by corresponding changes in the cultural adaptations of these groups, particularly in regard to settlement-subsistence systems in the study area. The nature of these cultural adaptations is discussed in chapter four. In this chapter we describe the physical setting within which these adaptations occurred.

Physiography

Perry Lake is located in the Delaware River valley, a southward flowing, north bank tributary of the Kansas River in Jefferson County, northeastern Kansas (Fig. 1.1). It is in the Dissected Till Plains section of the Central Lowland physiographic province (Schoewe 1949:291). This area was subjected to glaciation during the Pleistocene and is characterized by isolated occurrences of glacial till, outwash, and erratic boulders, cobbles, and pebbles. The topography grades from steeply dissected bedrock near stream valleys to hilly, upland terrain.

Structural Geology

A description of the exposed bedrock formations in the study area is necessary since local lithic materials, including limestone, sandstone, till, ferrous oxides (hematite and limonite), and, especially, chert, were utilized by the area's prehistoric inhabitants. The study area occurs in the Forest City Basin, a midcontinental structural feature that reflects the presence of a shallow sea during Upper Pennsylvanian time (Moore et al. 1944). This sea was subject to long term changes in its surface level. These changes formed a series of transgressive and regressive episodes, or cyclothems, that resulted in the deposition of materials which appear today as alternating beds of limestones and shales. Groups of these alternating beds are assigned to two stages, Missourian and Virgilian, of the Upper Pennsylvanian Epoch. At least thirteen of the limestone beds of these groups bear cherts (Reid 1979; Logan 1988a), the raw material most frequently utilized by the stone-age populations of the Central Plains.

Bedrock exposures in the Delaware River basin are entirely those of the Upper Pennsylvanian period and outcrops are primarily those of the Shawnee and Wabaunsee Groups of the Virgilian Stage (Moore 1949; Winslow 1972). Three known chert-bearing limestone members occur in the Shawnee Group, including the Ervine Creek Limestone member of the Deer Creek formation and the Toronto and Plattsmouth limestones of the Oread formation (O'Connor 1960). Of these formations, Deer Creek is the most extensive along the margins of the Delaware River valley and those of its tributaries (Winslow 1972). However, outcrops of the Oread formation occur along the lower Delaware River (most of these are now inundated by Perry Lake) and immediately east of that stream's divide along the margins of small tributary valleys such as Wild Horse Creek, Stone House Creek, Buck Creek, Mud Creek and Nine Mile Creek (Winslow 1972; Logan 1983, 1988a).

Little information is available for the cherts of the Ervine Creek limestone. O'Connor (1960:46) notes that "sparse chert nodules" occur near the middle of this 13- to 17-feet-thick member but fails to provide a description of them. Chambers and others (1977:53) tentatively ascribe a "grey to brown non-fossiliferous" chert in the Clinton Lake Project Area south of Perry Lake to the Ervine Creek limestone.

By far the more abundant and easily recognized cherts in the study area and its vicinity are those of the Oread formation. The Toronto limestone cherts occur as scattered, yellowish brown nodules common in the upper part of the member (O'Connor 1960:38). More recent research concerning the appearance of nodules and artifacts of this material at archaeological sites in northeastern Kansas has resulted in a more complete description (Logan 1985). Toronto cherts range in color from white to pale brown and yellowish brown, are medium to fine-grained in texture, homogenous, and relatively fossil-free. Plattsmouth cherts range from light to dark gray in color, are fine-grained in texture, and contain abundant silicified fossils, especially of fusulinids (Reid 1979; Logan 1985). They are the most ubiquitous cherts in the study area. In some areas where both Plattsmouth and Toronto cherts occur together, the latter seem to have been the preferred resource, despite the fact that the former are invariably more abundant (Logan 1988a). Discussion of the influence of these cherts on prehistoric lithic procurement and settlement activities is presented in chapter 7.

Hydrology and Drainage

The lower Kansas River basin, prior to construction of Perry Dam and Clinton Dam, was characterized by flooding of sometimes extensive proportions. Major floods during the 19th and early 20th centuries include those of 1844 and 1845 (Barry 1972: 510, 516), 1895, 1904, 1921, 1932 and 1951

(Chambers *et al*. 1977:41; Logan 1985; McCrae 1954). At least 90% of the Wakarusa River valley is composed of Newman Terrace (Dufford 1958), which is about 6 m (20 ft) above the average low-water stream level of much of the Wakarusa River (O'Connor 1960). This terrace was, prior to construction of Clinton Dam, still subject to vertical accretion during times of flood (cf. Davis and Carlson 1952). According to O'Connor (1960:61), "ordinary floods cover the Newman Terrace in the Wakarusa River valley to depths of a few inches to a few feet, but only severe floods cover this terrace in the Kansas River valley". Winslow's (1972) map of the geology of Jefferson County post-dates the creation of Perry Lake and therefore does not show the complete extent of the Newman Terrace in the Delaware River basin. However, a substantial portion of a remnant of this terrace is shown immediately below the dam near the confluence of the Delaware River and Slough Creek at an elevation of 850 ft amsl. Schmits and Parisi (1987:29) describe several "low terrace" remnants throughout the Perry Lake Project Area that would either correspond to or include the Newman Terrace. It can be assumed that this landform in the project area was as subject to flooding as it was in the Wakarusa River valley.

The Newman Terrace has been extensively eroded from lower Stranger Creek valley, the major drainage east of and, in part, adjacent to the Delaware River watershed. The correlation between the scarcity of prehistoric sites and the absence of the Newman Terrace in that area may reflect avoidance of that valley due to its poor drainage and flood-prone terrain (Logan 1985, 1988a). Obviously, flooding would have been a major factor in settlement decision-making by the prehistoric inhabitants of the lower Kansas River basin.

Chapter 3 contains a more detailed discussion of the evolution of the study area's landscape, with particular reference to terraces and to the nature of its soils.

Climate

The climate of northeastern Kansas is continental and is characterized by large daily and annual variations in temperature, which ranges from 20° to 67°F. from November to February and from 32° to 90°F. from March to October (Table 2.1). The climate of this region is described as moist subhumid (Thornthwaite 1941). Precipitation often exceeds evapotranspiration with the surplus either running off or soaking into the soil and replenishing ground water. Precipitation averages 37 to 38 inches annually and more than 70% of this occurs from April through September in the form of convectional thunderstorms (Table 2.2).

Table 2.1. Average Daily Maximum and Minimum Temperatures by Month in the Study Area (recorded at Lawrence, Kansas from 1941 to 1970).

Month	Average Daily Maximum °F.	Average Daily Minimum °F.
January	39.9	20.6
February	45.8	25.1
March	54.7	32.4
April	68.3	45.4
May	77.0	55.2
June	84.8	64.2
July	89.9	68.3
August	89.1	67.1
September	81.4	58.3
October	71.4	48.2
November	55.5	35.0
December	43.3	25.2
Year	66.9	45.2

From Dickey and others (1977:62).

Table 2.2. Average Monthly Total Precipitation in Douglas County (recorded at Lawrence, Kansas, 1941-1970).

Month	Average Monthly Total (inches)
January	1.10
February	1.18
March	2.40
April	3.76
May	4.23
June	6.04
July	4.68
August	4.20
September	3.76
October	3.04
November	1.57
December	1.44
Year	37.40

From Dickey and others (1977:62).

Snowfall averages 18 to 20 inches a year but is evenly distributed throughout the winter months (Bark 1977). Data on first and final freezes for the study area are presented in Table 2.3. The clash of warm, moist air masses from the Gulf of Mexico and cold, dry, polar air sometimes results in high intensity, flood-producing storms (Soil Conservation Service 1959). The area is not immune to the effects of other harsh climatic conditions, including blizzards, tornadoes and other severe windstorms, and droughts.

Table 2.3. Probability of Last Freezing Temperature in Spring and First in Fall for Oskaloosa (Jefferson County).

Probability	16°F or lower	20°F or lower	24°F or lower	28°F or lower	32°F or lower
Spring:					
1 year in 10 later than	3/27	4/5	4/11	4/20	5/4
2 years in 10 later than	3/21	3/30	4/6	4/15	4/29
5 years in 10 later than	3/9	3/20	3/28	4/5	4/19
Fall:					
1 year in 10 earlier than	11/12	11/4	10/24	10/14	10/7
2 years in 10 earlier than	11/18	11/9	10/28	10/19	10/11
5 years in 10 earlier than	11/30	11/20	11/7	10/28	10/21

From Dickey and others (1977:63).

Artz (1983a) has suggested that convectional storms did not always dominate the precipitation pattern in the Central Plains during the time of prehistoric occupation (cf. Knox 1983). Geomorphic evidence from the lower Walnut River valley in the Flint Hills of east-central Kansas and Cotton Creek valley on the border between the Flint Hills and Cherokee Prairie in northern Oklahoma demonstrates the prevalence of frontal storms from 4500 until 2000 BP in the former area and 1300 BP in the latter area. Similar shifts from frontal to convectional storm dominance may also have occurred in northeastern Kansas.

Paleoclimatic fluctuations have been inferred from the pollen spectra at Muscotah and Arrington marshes in the Delaware River basin (Gruger 1973). These marshes are about 23 km (14.3 mi) north of Valley Falls, Kansas near which town most of the 17 sites evaluated during our project are located. These data, their reflection of environmental dynamics, and their implications for understanding the adaptations of prehistoric groups that lived in the study area during the late Pleistocene and early Holocene are reviewed in the following section. This information has particular relevance to our interpretation of the two buried Archaic components at the Cut-Bank site (14JF409; see chapters 6 and 10).

Vegetation

During the late Pleistocene, the study area was part of an ecotone of two major biomes, the spruce forest of eastern North America and the montane conifer parkland that dominated the west and southwest (Gruger 1973). The pollen data from Muscotah and Arrington marshes reveal the presence of open vegetation, with some pine, spruce, and birch trees and local stands of alder and willow from at least 23,000 to 15,000 BP. An ecotone of grassland and deciduous woodland was established by at least 11,000 BP. It is not known how long it took for this ecotone to replace the coniferous forest biome that dominated northeastern Kansas during the Woodfordian stage of the Wisconsinan glaciation. An unconformity occurs between zones 2 (Woodfordian) and 3 (early Holocene) at Muscotah Marsh which precludes more accurate reconstruction of this important process. It is unfortunate from an archaeological point of view as well, since it is known that the area was inhabited by Paleoindians during that crucial transition period.

An abrupt increase in the percentage of Ambrosia and Franseria pollen marks the transition from zone 3 to zone 4 at Muscotah Marsh. This indicates an expansion of the prairie community, a phenomenon that occurred throughout the Midwest during a mid-Holocene climatic episode of increased aridity called the Altithermal (McAndrews 1966; King 1980; Antevs 1955). In northeastern Kansas, this prairie interval is dated at 9930±300 BP. The time transgressive nature of the process, which reflects the gradual northward retreat of glacial conditions, is demonstrated by the dating of prairie expansion in Minnesota and South Dakota at ca. 8000 BP (McAndrews 1966) and in southeast Missouri at ca. 8700 BP (King and Allen 1977). Zone 4 pollen frequency curves demonstrate the dynamic nature of the prairie-forest ecotone. In zone 4a, grasses and deciduous trees are both represented, although the latter account for only about 20% of the pollen. Zone 4b reflects a significant reduction of woodland components of this ecotone. Trees disappeared from the uplands and low values of some types of arboreal pollen suggest that the Delaware River floodplain "dried out over extensive areas" (Gruger 1973:245).

Zone 4c reflects a period of forest expansion and the eventual re-establishment of the ecotone that existed during the deposition of zone 4a. The transition from the prairie interval to the initial forest encroachment represented in zone 4c is dated to 5100±250 BP. Although the time transgressive nature of this episode is reflected by dating of this process in Minnesota at ca. 4000 BP (McAndrews 1966), in southeast Missouri it occurred at approximately the same time, ca. 5000 BP (King and Allen 1977).

The prairie-forest environment established after the Altithermal was, essentially, the modern ecotone. However, subsequent climatic episodes of increased moisture (e.g., the Atlantic) or increased aridity (e.g., the Pacific) would have affected the distribution of woodland and grassland communities. This modern ecotone is transitional from the oak-hickory forest of eastern North America to the tallgrass prairie of the Interior Plains and forms one of the most "conspicuous and important" examples of the ecotone concept (King and Graham 1981:131). It extends some 1,920 km from 30° to 45° N. Lat. and extends from east to west in the case of some species, such as bur oak, as much as 1,600 km. Shelford (1963:306-307) estimates that within the region of at least 932,400 km^2 that contains interspersed climax forest and prairie, approximately four million hectares are covered by forest-edge vegetation. Prairie-forest ecotone occurs in limited areas of Minnesota, Michigan, Ohio, and Indiana and in more extensive areas of Iowa, Illinois, eastern Nebraska, eastern Kansas, northern Missouri, and eastern Oklahoma (Transeau 1935; Shelford 1963; Kuchler 1964). The lower half of the Delaware River basin occurs within such an ecotone. The upper half of the basin is dominated by the tallgrass prairie community and throughout its length the Delaware River and its larger tributaries are skirted by a gallery of floodplain forest and savannah (Fig. 2.1).

The pre-settlement (i.e., pre-Euro-American) ecotone in the lower Delaware River basin was a mosaic of both prairie and woodland communities and, according to Kuchler (1974:588)

> the species of one type are not mixed with those of the other, and each of the two vegetation types involved retains its discrete character. The oak-hickory forest does not gradually open up into a savanna but keeps its identity; the bluestem prairie does likewise. Therefore, in eastern-most Kansas, forests with islands of prairie gradually change westward into a forest-prairie mosaic and finally into prairie with forest islands.

Table 2.4 is a list of the dominant species of the two plant communities that compose the ecotone of the study area.

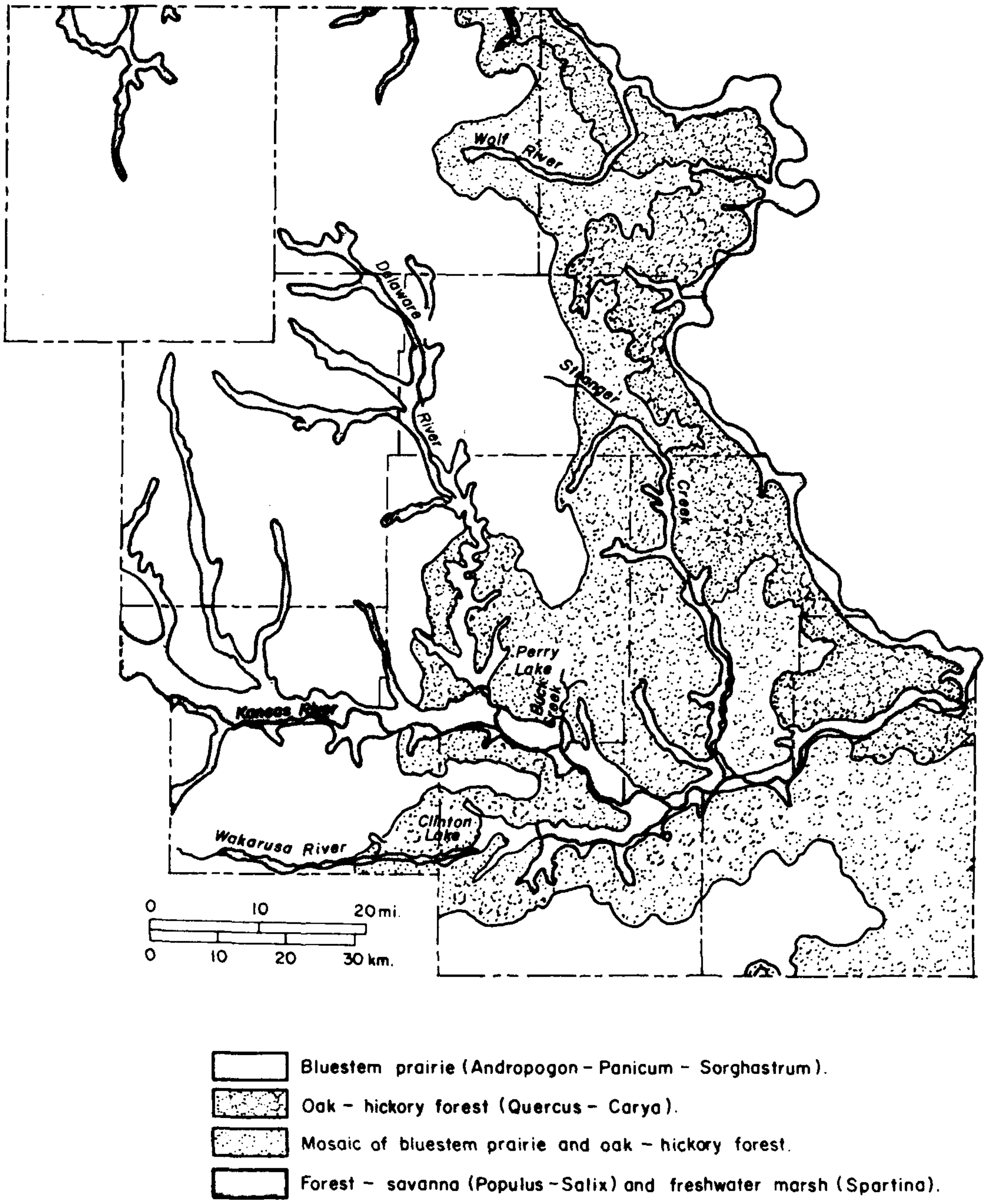


Figure 2.1 Map of the potential natural vegetation of the study area and vicinity. Note the location of Perry Lake with regard to the prairie-forest ecotone. Adapted from Kuchler (1974).

Table 2.4. Dominant Plant Species in the Study Area.

Common Name	Scientific Name
	Bluestem Prairie
Big Bluestem	*Andropogon gerardi*
Little Bluestem	*Schizachyrium scoparius*
Switchgrass	*Panicum virgatum*
Indian grass	*Sorghastrum nutans*
	Oak-Hickory Forest
Bitternut Hickory	*Carya cordiformis*
Shagbark Hickory	*Carya ovata*
White Oak	*Quercus alba*
Red Oak	*Quercus borealis* var. *maxima*
Black Oak	*Quercus velutina*

Data from Kuchler (1974).

Kuchler (1974:600-601; Fig. 2.1) proposes a natural flood plain vegetation for the study area of forest and freshwater marsh. Dominant trees in such a community are hackberry (*Celtis occidentalis*), cottonwood (*Populus deltoides*), black willow (*Salix nigra*), and American elm (*Ulmus americana*). In poorly drained areas of the Delaware River flood plain, such as abandoned meanders and shallow depressions, marshes would develop. The dominant vegetation in such places today is prairie cord-grass (*Spartina pectinata*).

A prairie-woodland ecotone is a tension zone sensitive to climatic fluctuations. The relative distribution of the two plant communities is affected by changes in the amount of precipitation of significant duration. Shelford (1963:317) describes this dynamic process:

> Dry and rainy periods of longer or shorter duration have alternated over thousands of years. During long, wet periods, forests expand from groves and stream-skirting strips to take possession of prairie areas. Some forests in Iowa and Illinois are now growing on black prairie soil that is 20 to 36 inches (50-90 cm) deep. During long, dry periods the process has been reversed. Grasses invade wooded areas and kill the shrubs and trees probably by monopolizing the water supply through a superior system of deep roots. Most of this competition between forest and prairie communities goes on in the shrubby edge that separates them.

It has been demonstrated that significant climatic shifts have occurred throughout the world during the Holocene (Bryson et al. 1970) and that these may have correlated with cultural adaptations in North America in general and in the Great Plains in particular (Wendland and Bryson 1974; Lehmer 1970; Wedel 1970). Evidence of forest invasion onto prairie soils during the Neo-Boreal climatic episode (ca. A.D. 1550-1830) has been found in Platte and Boone counties, Missouri (Logan 1979; Howell and Kucera 1956; Reeder et al. 1983) and in Iowa (Dick-Peddie 1952; Loomis and McComb 1944). Fitch and McGregor (1956) have noted that the forest was from 0.8 to 1.6 km wide on both sides of the Kansas River in the vicinity of the study area at the time of the Government Land Office surveys (1855-1860), indicating a significant expansion of the gallery woodlands along that stream during the period of Euro-American settlement. Given the evidence of past climatic fluctuations in the Midwest ecotone region, there is reason to believe that similar periods of forest expansion or recession have occurred in the study area in the past. Because of its ecotone setting, the study area provides an ideal laboratory for determining how prehistoric inhabitants of the prairie-plains border responded to such changes in their physical environment.

Fauna

Animals that inhabited the study area and its vicinity during the late Pleistocene (Wisconsinan) reflect the mixed environment of montane conifers and open grasslands indicated by the pollen spectra from Muscotah Marsh. Skeletal remains of now-extinct, late Pleistocene megafauna are occasionally recovered from alluvial deposits in the Kansas River below the Delaware River (Martin et al. 1979; Kost 1984). These include animals of the Symbos-Cervalces faunal province, associated with Pleistocene spruce forests in eastern North America (Martin and Neuner 1978), such as American mastodon (Mammut americanum), woodland musk-ox (Symbos cavifrons), woodland peccary (Mylohyus), and stag-moose (Cervalces). In alluvial deposits in the Kansas River basin to the west of the study area, the remains of animals of the Camelops-Navahoceras faunal province, associated with montane conifer parkland, are more frequently found. These include mammoth (Mammuthus) and camel (Camelops). The presence of a spruce-montane conifer parkland ecotone in or near the study area at a time when it was probably populated by small bands of big-game hunters has great implications for the study of Paleoindian cultural adaptations (Martin et al. 1979; Rogers and Martin 1982; Rogers and Martin 1983; Brown and Simmons 1984).

The modern animal life of the study area reflects the existence of grassland and woodland communities as well as the destructive effects of Euro-American settlement. These effects either directly through over-kill, or indirectly

through reduction of habitat, have included the extirpation of bison (Bison bison), wapiti (Cervus elaphus), grizzly bear (Ursus arctos), black bear (Ursus americanus), wolf (Canis lupus), prairie chicken (Tympanuchus cupido), wild turkey (Meleagris gallopavo) and other animals whose ranges might have extended to the Delaware River, such as mountain lion (Felis concolor) and antelope (Antilocapra americana). Other animals still extant in the area that, like those above, were important to the area's prehistoric inhabitants include white-tailed deer (Odocoileus virginianus), coyote (Canis latrans), red fox (Vulpes vulpes), gray fox (Urocyon cinereoargenteus), raccoon (Procyon lotor), badger (Taxidea taxus), bobcat (Lynx rufus), mink (Mustela vison), long-tailed weasel (Mustela frenata), striped skunk (Mephitis mephitis), squirrel (Sciurus niger and Sciurus carolinensis), and woodchuck (Marmota monax) (Bee et al. 1981). Other animals that figured in the subsistence economy of the prehistoric population of the area included a variety of mussels, fish, amphibians, reptiles, and birds of the aquatic, woodland, and grassland communities.

Fitch (1965:50-57) provides a comprehensive list of fauna identified at the University of Kansas Natural History Reservation and Rockefeller Experimental Tract. This "natural area" includes a tract of 590 acres in Section 4, Township 12 South, Range 20 East and the SW 1/4, Section 33, Township 11 South, Range 20 East in Douglas and Jefferson counties. The reservation is only about 14.5 km (9 mi) southeast of Perry Dam. The list includes the following numbers of species: snails and slugs (28), clams (2), earthworms (1), crustaceans (10), chiggers (22), spiders (191), butterflies (21), moths (226), ants, bees, and wasps (Hymenhoptera- 33), crickets, grasshoppers, kaytdids, and roaches (Orthoptera- 32), beetles (165), fishes (5), amphibians (10), reptiles (27), birds (179), and mammals (33). Aquatic habitats on the reservation do not include the slow moving, muddy or sandy bottomed, perennial streams required by such invertebrates as mussels. The variety of fishes in the Reservation is considerably less than would have been available to prehistoric peoples in the study area but this also reflects less diversity in aquatic habitats in comparison to the Delaware River basin. The listing is valuable, however, in that it demonstrates how a small tract of "natural" (the tract is actually maintained for experimental purposes) ecotone can support a wide variety of animal species.

Not only does the number of species increase along a tall-grass/oak-hickory forest edge, the population density of some animals also rises above that of adjacent communities (Odum 1971:157-159; Bee et al. 1981:9). This "edge effect" may have played an important role in the settlement and subsistence activities of prehistoric peoples who are known to have depended to a significant extent on such forest edge

game as white-tailed deer. In northeastern Kansas and northwestern Missouri, this animal was consistently favored over such prairie game as elk and bison from at least the Late Archaic period (e.g., Adair 1977; Artz 1978; Johnson 1972; Wedel 1943:27, 72-73 and 1959:664).

The bias toward deer may have reflected the relatively low population density of bison in the tallgrass community of northeastern Kansas during the Late Holocene. Skeletal remains of Early Holocene bison are found much more frequently in alluvial deposits of the Kansas River than those of Late Holocene bison. This contrast may be attributable to the prairie expansion that occurred during the Altithermal (Rogers and Martin 1983). The low density of modern bison in northeastern Kansas is also reflected in the absence of any mention of bison in the region by early Euro-American explorers and settlers (Logan 1985).

The white-tailed deer population in the study area is monitored and controlled today by the Kansas Fish and Game Commission. Most of the study area falls within a section of the state that has a medium distribution and density of deer. Some areas of northeastern Kansas are known to support a high density and distribution of deer, according to the Kansas State Cooperative Extension Service (cited in Corps of Engineers 1981:77). The Delaware River basin undoubtedly supported a larger population of deer and other woodland edge game during pre-settlement time. Based on the accounts of Lewis and Clark, who reported seeing large numbers of deer on the prairie-forest edges along the Missouri River in the summer of 1804, Shelford (1963:314) suggests their population at that time may have been as high as 20 deer per km^2 of river-skirting forest. However, climatic fluctuations, such as the Altithermal, that resulted in the expansion of prairie at the expense of woodland would have reduced the deer population and also affected its density and distribution. We can therefore hypothesize that the subsistence activities and, perhaps, the settlement practices of human populations dependent on these animals would have been adjusted accordingly.

Chapter 3

GEOMORPHOLOGY OF THE PERRY LAKE PROJECT AREA

William C. Johnson

Introduction

In recent years, archaeologists have recognized that the preserved record of past cultural activities is evidence of, with varying degrees of accuracy, both the articulation of human groups and their environment and the effects of post-occupational processes on the material remains of those activities. The data base is, however, not inherited in a pristine state. The archaeological record does not precisely mirror past cultural activities, i.e., they formed vulnerable, 'fossil' configurations, which in turn are frequently flawed by a host of post-depositional processes. The processes must be reckoned with, and the extent of their influence on the mute record realized before the ultimate goal of explaining human adaptation can be achieved (Logan, 1985). Because the record was most certainly disturbed by geomorphic processes, it is important that the relationship between ongoing geomorphic processes, particularly erosion and deposition, be appreciated for the recognition of landscape change and interpreting the consequential variability in the archaeological record.

This discussion attempts to go at least part way in addressing the taphonomy of archaeological sites through an examination of the geomorphology of the Delaware River valley in the Perry Lake project area, particularly the northern portion. The geomorphic investigation involved both field and laboratory analyses of topography, soils, soil-geomorphic relationships, and sediments. Because of the limited scope of the study, an absolute chronology was dealt with only to a small extent. However, given the geoarchaeological data base now available for the Kansas River basin, information gleaned from this study is sufficient to permit us to place it within the overall regional scheme.

Late-Quaternary Geomorphic History of the Lower Kansas River System

Despite the basin size and relatively large contribution of flow of the Delaware River to the Kansas River, little is known about the late-Quaternary landscape evolution of the river system. Previous investigations in and around the project area, both archaeological (e.g., Witty 1964, 1983; Jones 1968; Reichart 1984; Schmits 1987) and geological (e.g., Winslow 1972) in nature, do not provide detailed geomorphic information. The Delaware River system is located, however, within the lower Kansas River drainage for

which there is significant data on late-Quaternary landscape evolution. This study does provide sufficient information to indicate that the history of landscape evolution for the Delaware River system may be inferentially derived.

Glacially-associated deposits in northeastern Kansas, i.e., the lower Kansas River basin, include pre-Illinoian till, glaciofluvial and glaciolacustrine sediments, and loess. The till deposits, 3-15 m thick, occur both north and south of the Kansas River in most topographic positions. Valley-bound deposits of pre-Illinoian age are primarily glaciofluvial and glaciolacustrine in origin. Outwash commonly occurs in thicknesses of 10-20 m, with local deposits of 30 m or more (Jewett et al. 1965).

Eolian deposits of Pleistocene age, primarily loess with locally occurring sands, mantle the uplands and alluvial fill of high terraces. Although not evidenced at all loess exposures, two lithostratigraphic units exist, the Loveland loess and the overlying Peoria loess. The Loveland loess, associated with the Illinoian glacial stage, is best exposed on the north-central fringes of the Kansas River basin at such localities as the Eustis Ash Pit (Fredlund et al. 1985) and Buzzard's Roost (Schultz 1968) in southcentral Nebraska. Numerous paleosols, including the Sangamon complex, suggest this reddish or pinkish-brown, noncalcareous loess has a complex depositional history. Peoria loess, the major Wisconsinan-age eolian formation recognized in the basin, is massive, yellow-tan to buff-colored, and consists of well-sorted very fine sand, silt, and clay. It mantles most of the uplands in Jefferson County, but thins to less than 2 m west of the county before thickening again in northcentral and northwestern Kansas. Radiocarbon determinations from the Gilman Canyon Formation, which underlies the Peoria loess, suggests a basal age of approximately 20,000 years ago for the loess (Dreezen 1970; May and Souders 1988). Recent work in the Kansas River basin by Stewart (1987), Johnson (1989), and others has identified Leonard's Tazewellian faunal zone (Leonard 1951) in association with Paleoindian material and extinct megafaunal remains.

The Bignell Formation (Schultz and Stout 1945), a third loess unit, is recognized in the Kansas River basin. It is apparently of Holocene age but is so thin that it may often be included entirely within the A horizon of the surface soil. It is less cohesive and of a lower bulk density than the underlying Peoria loess, and may be a consequence of redeposition of the latter. The Bignell is distinguished primarily by the presence of the intervening Brady soil (Schultz and Stout 1948), where present. The Brady soil is about 10,000 years old based upon radiocarbon dating (Frye et al. 1968; Dreezen 1970). Therefore, the Brady soil and younger (Holocene) Bignell loess must be fully appreciated for their probable cultural associations.

For most river basins, the bulk of the archaeological record is generally retrieved from bottomlands due to richness and diversity of the resource base. Further, because rivers are dynamic geomorphic entities, the cultural record will not be confined to surfaces (terraces and floodplains), but will also be buried, sometimes at great depth, as with the Paleoindian and Archaic sites found thus far in the central Great Plains. While terraces and floodplains have been studied for some time in the Kansas River basin, only recently has an understanding of the subsurface and an appreciation for the stratigraphic record that is gone, as well as that which has persisted, begun to emerge.

Significantly more is known about terraces and fills of the valley of the Kansas River proper than those of tributaries. The sequence described below is depicted in Figure 3.1. Although terraces were recorded in the Kansas River valley as early as the 1930s (e.g., Newell 1935; Hoover 1936), names were not assigned until Davis and Carlson (1952) designated the Menoken, Buck Creek and Newman Terraces, to correspond to the last three of the four classical Pleistocene continental glaciations. Shortly thereafter, McCrae (1954) defined the Holliday Terrace, which was later mapped as the "intermediate surface complex" by Dufford (1958). Elks (1979) proposed the compromise name of Holliday Terrace Complex. Not surprisingly, even given the relatively short river reach from which they were derived, these terrace names have become entrenched in the basinal literature. Subsequent investigations have indicated no present need for a revision in names, but certainly one for the ages, as originally proposed, is in order (Johnson, 1985).

Although not precisely stated by Davis and Carlson (1952), it is implicit that the Menoken Terrace, the oldest of those identified, was created as the classical Kansas (pre-Illinoian) ice sheet retreated from the lower end of the basin (Dort 1987). The terrace, reaching heights of up to 33 m above the present floodplain, is comprised of sediments, according to Davis and Carlson, that were deposited by glacial meltwater. Their supposition was based upon the upward-fining sequence of coarse outwash to reddish sandy silt. Subsequent field investigations characterized Menoken terrace fill as glaciolacustrine and undifferentiated till deposits (Beck 1959; Jewett et al. 1965; O'Conner 1971) and also ice-contact deposits (Sorenson et al. 1987). The terrace may actually be an erosional surface truncating deposits of several origins (Dort 1987). Although the areal extent of the Menoken Terrace and underlying fill is yet an enigma, remnants in the valley landscape have a largely unexplored cultural record.

Post-Kansan entrenchment, including erosion of the bedrock valley floor, and subsequent filling resulted in the

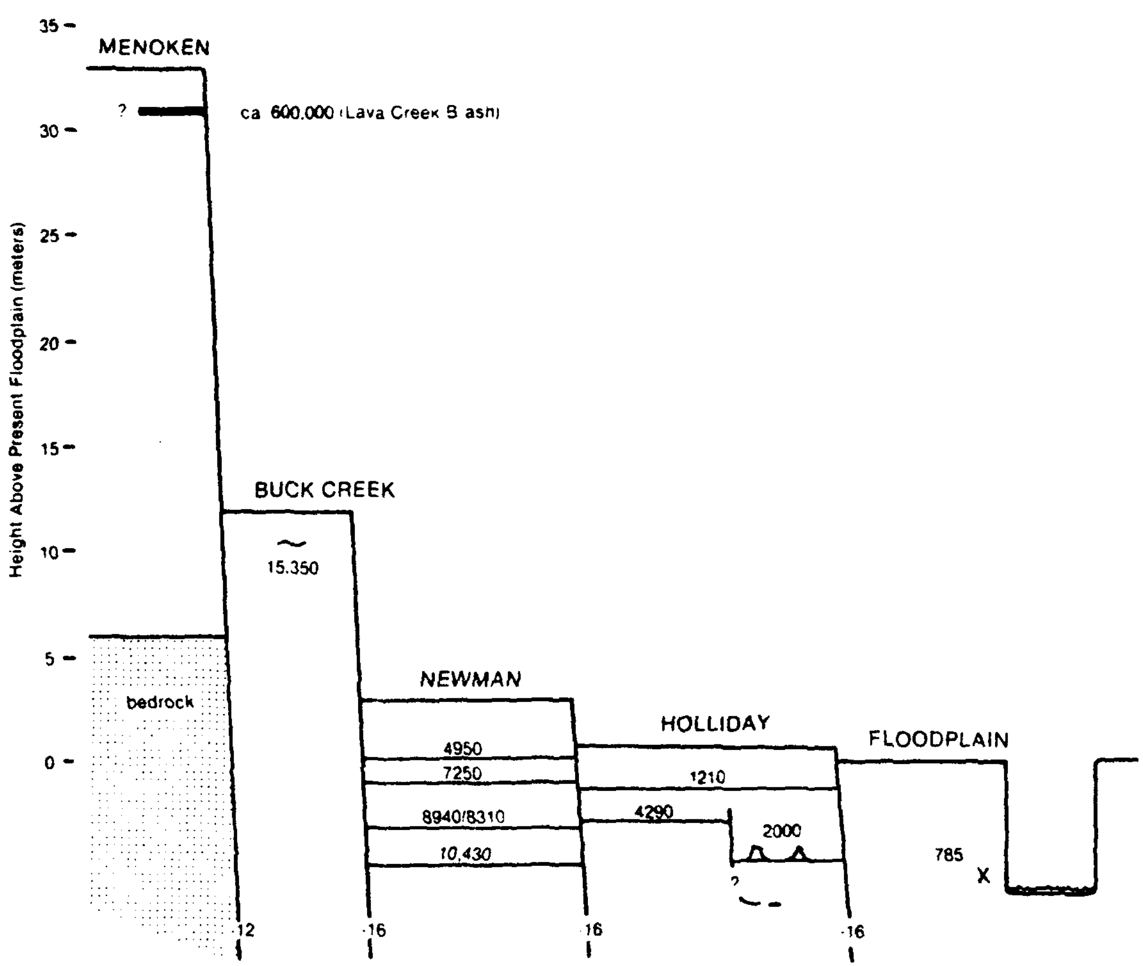


Figure 3.1. Schematic diagram of terraces and associated fills in the lower Kansas River valley. Ages in years B.P.

12-meter-high Buck Creek Terrace. The terrace was described by Carlson (1952) as being overlain by Loveland and Peoria Loess. Beck (1959), however, described the fill as sand and gravel grading upward into silt and clay with a possible upper eolian component. The age of the fill and surface was presumed to be Illinoian, as it purportedly truncates Kansan alluvium and is overlain by loess. A layer of fluvially redeposited volcanic ash buried 1.7 m below a remnant of presumed Buck Creek Terrace was fission-track dated at ca 600,000, and is considered to be the Lava Creek B ash (Geil 1987). If this is, in fact, the Buck Creek Terrace, then fill below the ash would have a minimum age of Illinoian (e.g., Boellstorf 1976) or Yarmouthian (e.g., van Eysinga 1978). This investigator believes the ash to be from Menoken Terrace fill, based upon elevation of the surface, the stratigraphic relationship between Newman and Buck Creek Terrace fill, and a radiocarbon age of about 15,350 yrs B.P. recently obtained from Buck Creek Terrace fill by Mandel (1987a). The soil commonly associated with the Buck Creek Terrace is the Gymer, a montmorillonitic Typic Argiudoll, most likely formed in Loveland and younger loess (Sorenson et al. 1987). The Buck Creek Terrace occurs as scattered remnants within the middle and upper reaches of the Kansas River valley. Those remnants are located largely at the confluence of tributary valleys (Fader 1974; Holien 1982), a situation considered desirable to prehistoric peoples, based upon limited surveys.

The Newman Terrace is the dominant terrace in the lower third of the Kansas River valley, where it occupies anywhere from nearly half to only 10 percent of the valley floor; a general decrease occurs downstream as the valley narrows (O'Conner 1960). Its origin is attributed by Davis and Carlson (1952) to valley cutting in response to the Wisconsinan glacial meltwater loads of the Missouri River and subsequent filling, presumably during the late Wisconsinan and early Holocene. The resulting surface, up to 3 m above the modern floodplain, is flat and poorly drained, with few features; there is a distinct lack of meander scrolls (or scars), which characterize lower surfaces. The absence of surface features has been attributed both to overbank, vertical accretion (Dufford 1958) and to an unexplained lack of migration (Davis and Carlson 1952). It was probably inundated, at least in part, by floodwaters in 1844 and 1903, and certainly in 1951 (Davis and Carlson 1952). The historical flood record and the fine-silty mixed Cumulic Haplustoll soil developed in the surface indicate a geologically frequent and significant contribution of overbank sediments.

Basal Newman fill is cobble/boulder gravel fining upward (Beck 1959; O'Connor 1960) into dark, silty clay (O'Conner 1971). A study locality near Bonner Springs, Kansas, has produced radiocarbon ages of 10,430±130 and 8940±90 yrs B.P.

from soils buried within the alluvial fill. The youngest radiocarbon age from Newman fill to date is 4950±120 yrs B.P., obtained near Wamego, Kansas (Johnson 1987). Existing age control on the accumulation of fill indicates the Newman Terrace to be no older than about 5000 years, but it is likely up to 500 years younger due to the presence of one or more undated buried soils above the 4950-yr level.

At sometime during the late Holocene, another major period of cutting and filling occurred, resulting in the Holliday Terrace Complex, which rises only 1-2 m above the floodplain, and often is separated from the latter by a natural levee (McCrae 1954). Areally, the surface is found throughout most of the lower Kansas River valley, and both it and the Newman extend up major tributary valleys. The Holliday Terrace Complex exhibits a frequently intricate pattern of meander scrolls and abandoned channels with up to 3 m of relief. McCrae (1954) recognized two ages of meander scrolls based upon the radius of curvature and elevation, the more recent being of greater radius and lower elevation. Holliday fill is composed of sand, silts and clay, with the fine silt and clay fractions located in the abandoned channel features. Radiocarbon ages obtained from beneath the Holliday terrace at Bonner Springs range from 4290 to 1210 yrs B.P. (Johnson 1987). Newman fill is generally more yellow or orange in color than that of the Holliday, probably indicating a predominant loessal source for the older Newman fill. Also, Newman fill has a higher percentage of clay and fine silts, in contrast to the coarse silt and fine sand of the Holliday fill (Johnson 1987). Notably, the fill beneath each terrace contains paleosols, which indicate repeated stability and opportunity for long-term cultural occupation.

The present floodplain is of subtle relief created primarily by channel scars with little curvature and an alignment similar to the adjacent channel (Holien 1982). The fill, consisting of coarse sands, silts and occasional clay lenses, is usually coarser than that associated with adjacent terraces. This surface dominates the lower 50 km of the valley, possibly due, in part, to valley narrowing. The age of the floodplain is probably less than 1200 years based on terminal radiocarbon ages associated with the Holliday Terrace Complex fill, a general paucity of prehistoric surface archaeological material, and radiocarbon ages of 700-900 yrs B.P. from within its fill. Soils, primarily mixed Typic Udipsamments, reflect the relative youth of the surface as well.

No less than twelve workers have independently mapped terraces in the Kansas River valley, i.e., from the confluence of the Republican and Smoky Hill Rivers to the Missouri River, about 272 river km. The terraces, with the exception of the Menoken, are relatively easy to correlate throughout the Kansas River valley. Also, the limited data

on ages of the different fills suggest consistency within the river valley. Terraces are increasingly preserved in the upstream direction, due in part to valley widening. A valley reach in the vicinity of Lawrence, Kansas, illustrates the appreciable amount of terrace comprising the valley floor, in this instance about 70% (Johnson and Logan 1990). Overall, archaeological finds resulting from surveys conducted in the Kansas River valley increase proportionally with the relative amount of terrace preserved. Density and nature of the cultural evidence from within the basin does, however, suggest there was a preference for large- and medium-sized tributary valleys.

Methods of Investigation

Geomorphological analysis of the archaeological sites was executed through both field and laboratory investigations. In the field, sediments, stratigraphy, and soil profiles were examined in natural exposures (stream cutbanks and slope cuts) and in man-made exposures consisting of archaeological test units/excavations, backhoe trenches (Fig. 3.2a) and machine-extracted cores (Fig. 3.2b). Soil profiles were described in accordance with procedures presented in the Soil Survey Manual (Soil Survey Staff 1981) and Keys to Soil Taxonomy (Soil Survey Staff 1988). Sediment and soil samples collected were taken from fresh, cleaned faces and stored in sealed sterile plastic bags until analyzed. Particular care was taken with those samples having potential for radiocarbon dating, e.g., buried paleosols and charcoal. The correlation and dating of surfaces and underlying sediments, particularly stream terraces and alluvial fill, was done through 1) soil texture and degree of development, 2) relative topographic position and absolute elevation, 3) prehistoric culture-time period associations, and 4) radiocarbon dating. Except for the latter, these were accomplished primarily in the field via foot and vehicle survey using standard U.S.G.S. 7.5 min. topographic quadrangle maps and the Jefferson County soil survey (Dickey et al. 1977).

Laboratory analyses, except for the radiocarbon dating, were conducted in the University of Kansas Department of Geography Soils-Geomorphology Laboratory. The standard suite of analyses included particle-size distribution (texture) by pipette method (Day 1965; Gee and Bauder 1986), organic matter content (%) by the loss-on-ignition (LOI) method after removal of carbonates (Nelson and Sommers 1982), moist Munsell colors, and pH in a 1:1 equilibrated mixture of distilled water and soil (McLean 1982). These standard analyses were selected because they provide the most information for the least cost. Radiocarbon assays were contracted to Beta Analytic, Inc., because of their relatively short 30-day turn-around time on submissions and their positive reputation.

a

b

Figure 3.2a. Backhoe trenching as a means of subsurface exploration. The machine is digging trench number 5 at 14JF105.

Figure 3.2b. Use of the Giddings Soil Probe to extract cores from archaeological sites. R. Logan is examining the core taken at 14JF448.

Alluvial Geomorphology

Alluvial Surfaces: The valley-bottom landforms, created through fluvial processes, are not atypical and include floodplains, meander scrolls, natural levees, low and high terraces, and alluvial fans. Focus here, because of the archaeological discoveries and potential, is upon the terraces and the underlying alluvial fill.

The Delaware River and its major tributaries, Walnut Creek, Cedar Creek, Peter Creek, Brush Creek, Rock Creek, Duck Creek, and others, lie within valleys exhibiting well developed and preserved terraces. Winslow (1972) mapped "alluvium" (Qal), "Newman terrace deposits" (Qn), and "other terrace deposits" (Qt). The Qal map unit includes the floodplain (T-0) and low terrace (T-1) in general, but does occasionally involve the high terrace (T-2). The low terrace (T-1) is presumed equivalent to the Holliday terrace of the Kansas River valley. Newman terrace (Qn) is not mapped in the valley above the dam, but occurs extensively in the Kansas River valley and extends up to and makes contact with the dam on the downstream side. The type area for the Newman terrace is located in the Kansas River valley near the confluence with the Delaware River, i.e., at the town of Newman, Kansas. There is, however, a Newman equivalent in the project area adjacent to the reservoir and immediately above it, north of Valley Falls and apparently upstream of the project area, where no field survey was undertaken. Also, one archaeological site (14JF409) occurs in fill of Newman age, although its elevation indicates it is a low-terrace, or T-1, surface. "Other terrace deposits" (Qt) are mapped in the Kansas River valley, tributary valleys to the reservoir, and in the Delaware River valley above the reservoir. This map unit designates one or more surfaces higher than the Newman where it occurs in the Kansas River valley of southcentral Jefferson County. It appears from stratigraphic relationships and surface soil development to represent the Buck Creek Terrace in most instances.

As implied above, results of geomorphological studies associated with this project indicate that there are at least two terrace surfaces, referred to as the high, or T-2, and low, or T-1, terraces. They are very similar in height, making differentiation difficult. Also the scarp between the two is sometimes obscured due to alluviation of the low terrace by past-settlement alluvium. Consequently only subsurface probing can reveal the contact, or, in rare instances, soil changes mapped in the county soil survey. Low-terrace deposits are usually silty or clayey, only weakly oxidized, and have soils with an A-Bt-C profile sequence developed at the surface. The topographically higher and older T-2, or high-terrace, deposits are of similar texture, but are moderately to strongly oxidized. Also, the Bt horizon is thicker and better developed. Strath terraces, horizontal surfaces cut on bedrock by a river, occur

frequently within the project area. In some instances they are well exposed such as adjacent to 14JF410, and in others they are buried, or mantled, by alluvium to form a T-1 or T-2 surface such as at 14JF420.

The floodplain surface, T-0, occurs topographically below the T-1 and T-2 surfaces and is usually separated by an ill-defined scarp. In many instances, the scarp is buried due to alluviation in the historical and perhaps post-dam era. Floodplain may be further differentiated into two surfaces, not always on the basis of elevation, but on the presence or absence of recent channeling or scrolling. The channeled deposits are extremely variable in texture, from heavy clays to sandy loam or sand. Lateral migration of the Delaware and tributaries has cut away non-channeled floodplain and low-terrace sediments at some localities, resulting in juxtaposition of the young channeled deposits and high terrace. This is not evidenced at any of the archaeological sites investigated in this study, but can be observed between the town of Valley Falls and the upper end of the reservoir. Floodplain soils are poorly developed because of their relative youth and consist of A-C horizon sequences. Stratification is often visible in the channeled floodplain deposits, particularly the C horizon.

The post-settlement alluvium noted above has been deposited in the last 100 to 150 years and often buried the older floodplain and low-terrace deposits. Agricultural development of the landscape dramatically increased upland erosion, resulting in high delivery rates of sediments to streams, those in the project area being no exceptions. Also, the creation of the impoundment in the Delaware River valley promoted accumulation of sediment on floodplains and low terraces. In burying some of these prehistoric surfaces, it is likely the surface sediment now obscures some archaeological material or sites.

In sum, three alluvial surfaces have been identified in the project area: high terrace, low terrace, and floodplain. The low terrace and floodplain are far more extensive than the high terrace due to their younger age. Topographic expression of the contact between these surfaces is often absent. Figure 3.3 illustrates the array of types of contacts noted in the project area. The study area is not unique in this regard, and the recognition of these relationships between surfaces and ages of underlying fills is essential to development of a variable geoarchaeological model. It is evident that surface soils, buried soils, and topographic expression are all important.

Alluvial Chronology: Because all subsurface exploration, whether by natural or man-made exposures, was relatively shallow and few radiocarbon assays were obtained, little information is available for the ages of alluvial deposits

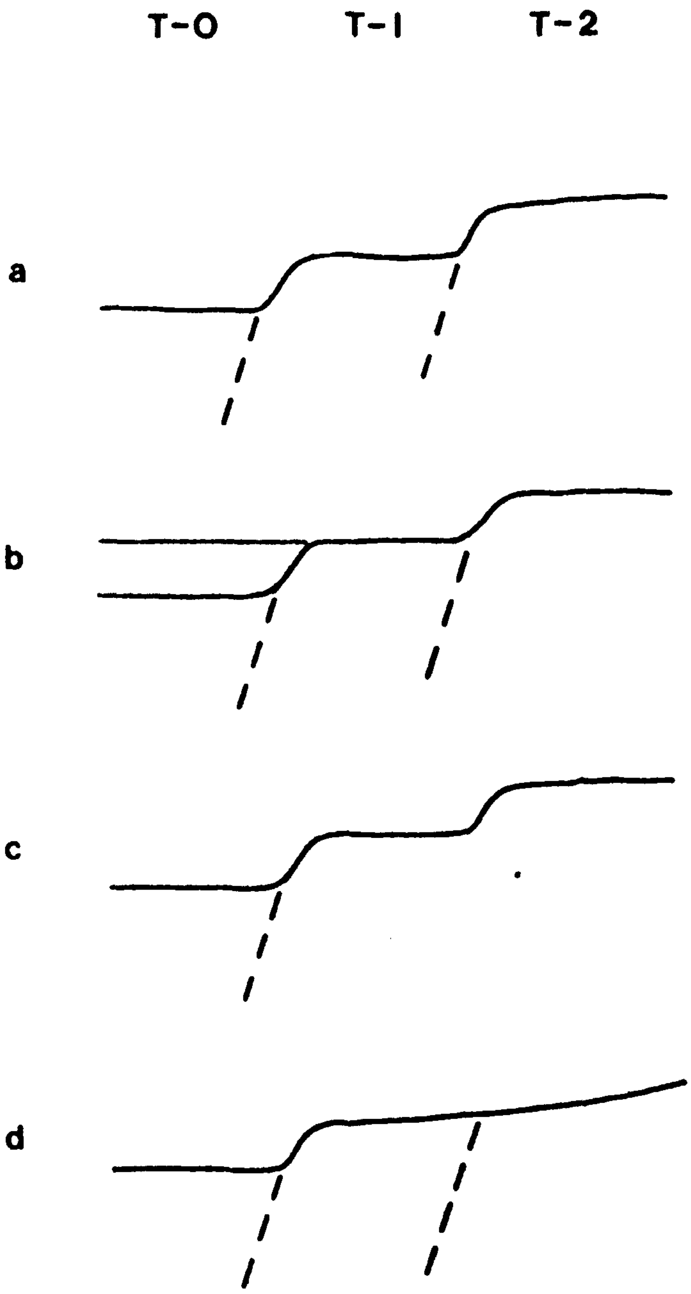


Figure 3.3. Schematic diagrams of some alluvial surface-alluvial fill relationships noted in the project area. The schemes include (a) "normal" floodplain (T-0), low terrace (T-1), and high terrace (T-2) cut and fill relationships with scarps present, (b) burial of the floodplain by post-settlement alluvium, (c) a low terrace cut into high-terrace fill, and (d) lack of a scarp separating the low-terrace from the high-terrace fill.

in the Delaware River system. Also, since no work of this nature has been conducted in the basin outside of the project area, available knowledge comes exclusively from this study. The six radiocarbon ages obtained from the investigation are presented in Table 3.1. Only four of the ages, representing three localities, are from alluvial sites. The latter range from early to late Holocene in age.

The oldest radiocarbon ages came from 14JF409, the Cut Bank site, located on the east side, or left bank, of the Delaware River within a narrow (30-40 m) remnant of low- and possibly high-terrace fill merging with the colluvially-derived facies from the adjacent Upper Pennsylvanian Severly Shale and Topeka Limestone, and overlying loess mantle. The low terrace has been mantled by post-settlement alluvium within which has developed a rudimentary soil (A-C horizonation). At about a 60 cm depth, a buried soil is encountered. The radiocarbon determination came from a depth of 3.5-4 meters within two separate profiles, excavated into the cut bank of the Delaware River channel. The upstream, or northern-most, of three profiles produced the age of 5710±100 yrs B.P. from a cultural feature. In profile 2, a few meters downstream, or south, an age of 6220±350 yrs B.P. came from another cultural feature. The notable point for this site is that the two radiocarbon dated features, although at approximately the same depth, were from two different alluvial fills. The younger age was derived from fill of a valley-side gully inset into the somewhat older Delaware River alluvial fill. Without an examination of the stratigraphy, however, the surface would indicate a single fill for both because of the uninterrupted flat surface. The soil buried at approximately 60-cm depth does occur in both fills, i.e., it post-dates the cut and fill episode. Although no radiocarbon age was obtained from the buried soil, data presented by Johnson and Martin (1987) and Johnson and Logan (1990) and from sites 14JF410 and 14JF402 (Table 3.1) indicate a minimum age of 1000 yrs B.P. The two radiocarbon ages, being early to middle Holocene, suggest the fill is equivalent to the Newman Terrace of the Kansas River valley proper, although the elevation and relatively young buried soil near the surface suggests a correlation with the Holliday Terrace fill. It appears the older alluvium was aggraded in the late Holocene, perhaps after truncation. The stratigraphy does not, however, provide conclusive evidence of truncation.

Approximately one-half kilometer south of 14JF409 is the unnamed site of 14JF410. A C-13 corrected radiocarbon age of 1000±70 yrs B.P. was obtained from soil humates collected in the basal 5 cm of an A horizon buried 60 cm below surface. This age corresponds with those secured elsewhere from upper Holliday Terrace fill. Again, however, this appears to be a T-1, or low, terrace based upon topographic position and elevation above the channel bed. The alluvial

Table 3.1. Radiocarbon Ages from the Delaware River Perry Lake Project Area.

Site No.	Lab No.	C-14 (Yr B.P.) Age	δ C-13 Corrected Age (YrB.P.)	Material Assayed	Landform
14JF409	Beta -29435	8,220±350	--	charcoal	T-1 terrace
14JF409	-29436	5,710±100	--	charcoal	T-1 terrace
14JF410	-29656	910±70	1,000±70	soil humates	T-1 terrace
14JF414	-29433	2,620±110	--	charcoal	Upland
14JF414	-29434	1,200±60	--	charcoal	Upland
14JF482	-29657	2,380±70	2,450±70	soil humates	T-1 terrace

fill beneath is only weakly oxidized and the buried soil has a simple A-C horizon sequence. Post-settlement, or historical, alluvium covers the buried soil, and it exhibits lamination with a very weak A-C soil profile development.

Approximately five kilometers downstream at site 14JF482, another near-surface buried soil was radiocarbon dated. The paleosol is buried at a depth of 1.6 m, significantly deeper than at the previous two sites. Development of the buried soil is also much better at this site than at the others, i.e., a Bt horizon has developed. The overlying sediments reveal a soil with a simple A-C horizon profile sequence, but it is better developed than the surface soils at the other two sites. The greater degree of soil development is reflected in the corrected radiocarbon age of 2450±70 yrs B.P. from humates in the basal Ab horizon. The radiocarbon age here is also consistent with the Holliday Terrace fill of the Kansas River valley. Topographic and elevational situation indicate it is the low terrace, as the former two.

The absolute age of the floodplain (T-0) alluvial fill is unknown, but soil development evidence indicates that these proximal channel deposits are 1000 or less years old. Certainly the channeled floodplain deposits are very young, on the order of a few hundred years or less in age. Weakly developed A-C profiles and pronounced stratification attest to their relative youth. The dramatic shift in channel positions in other streams of eastern Kansas during the

historical period, as documented by Dort (1980), suggests many of the channeled floodplain deposits may be 100 or less years old. Consequently, the probability of *in situ* prehistoric cultural material being found is very unlikely.

In summary, the few radiocarbon dates indicate that the age of the low-terrace fill can range from early Holocene to historical. Primary surface stability likely occurred around 1000 years ago. The age of high-terrace fill is unknown in the project area since no radiocarbon data were obtained. Soil stratigraphy indicates surface stability may have been as recent as the late Pleistocene. Ages of floodplain (T-0) fill range from about 1000 years ago, i.e., after stabilization of the T-1 terrace, to historical.

Regional Correlations: As Johnson (1944), Frye and Leonard (1954), Ruhe (1969), and many others have pointed out, the identification and correlation of terraces is fraught with problems. Investigator variance becomes a particular problem because of the subtle relief typical in the valley bottoms. Differing definitions of floodplain and terrace may also exacerbate the problem. Finally, differential preservation of the record is immediately realized as a tremendous variable; terraces once present in certain reaches may have been removed. All that can be done practically, given the available data, is to compare surface soil characteristics and limiting ages on terrace fill, as they are the best geomorphic indicators for deriving estimates of time and degree of surface stability.

With terrace systems and fills best defined, especially for the late Pleistocene and Holocene, in the Kansas River valley, there is a predictable tendency for subsequent studies in tributaries to "force" observations into the established terrace nomenclature and age associations established in the Kansas River valley.

The limited number of radiocarbon ages derived from the project area creates difficulty in comparing the alluvial record of the Delaware River system with those of other river systems within the Kansas River system and others in the east-central Great Plains. Therefore, the findings of this study can be related to regional chronologies only in a very tentative and general way.

Within the alluvial landscape, latest Pleistocene and Holocene terrace fills have the greatest cultural potential because of their relatively large areal extent and age span. Older deposits generally cover a smaller area and have little likelihood of buried cultural material. Conversely, floodplains are typically too young to produce a record of any antiquity. Holocene fills of the Kansas River basin, including the Delaware River, commonly exhibit a number of buried soils, which are major stratigraphic markers. They

usually appear as a simple A-C horizonation, but can exhibit a Bw (color or structural) or even Bt (silicate clay accumulation) horizonation as well. The paleosols are indicators of periodic bottomland stability, i.e., times of slowed sedimentation. Consequently, the probability for both the use of the surface by humans and the concentration of cultural artifacts should dramatically increase (Ferring 1986b). Due to the rarity of finding wood or charcoal, heavy reliance has been placed upon the dating of soil humates, despite the acknowledged problems (e.g., Haas et al. 1986). Together, nearly twenty localities or study areas in the basin provide radiocarbon ages from buried A horizons. There is an unfortunate, but not unexpected, spatial bias toward the eastern portion of the basin due to the locations of reservoirs and larger urban areas and also to a paucity of natural exposures in the extreme western, upper reaches of the basin.

The temporal distribution of the ages from the buried soils produces a distinct clustering (Fig. 3.4; Johnson and Logan 1990). The designated ages of 10,500, 5,000, 4,200, 2,600, 2,000, and 1,200 indicate the approximate midpoints for times of terminal soil development. Since the ages are terminal (i.e., determined from the uppermost few centimeters of the Ab horizons), they represent the final stages of alluvial surface stability and impending alluviation (i.e., instability). The number of ages in each clustering reflects both the relative degree of paleosol development and extent of occurrence, or preservation.

Of the six major periods of soil formation, the two oldest (10,500, 5,000) and two most recent (2,000, 1,200) are extremely well pronounced and widespread. Soil formation occurring about 10,500 yrs B.P. is associated with late Clovis and early Folsom or Plainview/Dalton phases of the Paleoindian period. Widespread soil development about 5000 yrs B.P. falls within the early part of the Late Archaic period, correlating with local phases such as the Black Vermillion (5300-4500 yrs B.P.). Soil development around 2000 yrs B.P. corresponds with the generally accepted boundary between the Late Archaic and Plains Woodland cultures. The most recent buried soil surface, dated about 1200 yrs B.P., falls near the boundary of the Plains Woodland and Plains Village cultures. Interestingly, the terminal ages for all four of these periods of soil surface development coincide with the established temporal limits of major cultural periods or phases. The relationship may be yet considered only coincidental, although a growing body of paleoenvironmental information available for the region does indicate these were times of climatic change (Gruger 1973; Hall 1982; Muhs 1985; Bozarth 1986; Johnson 1988).

There is a well-defined hiatus in the record represented in Figure 3.4: a period of approximately 2000 years during

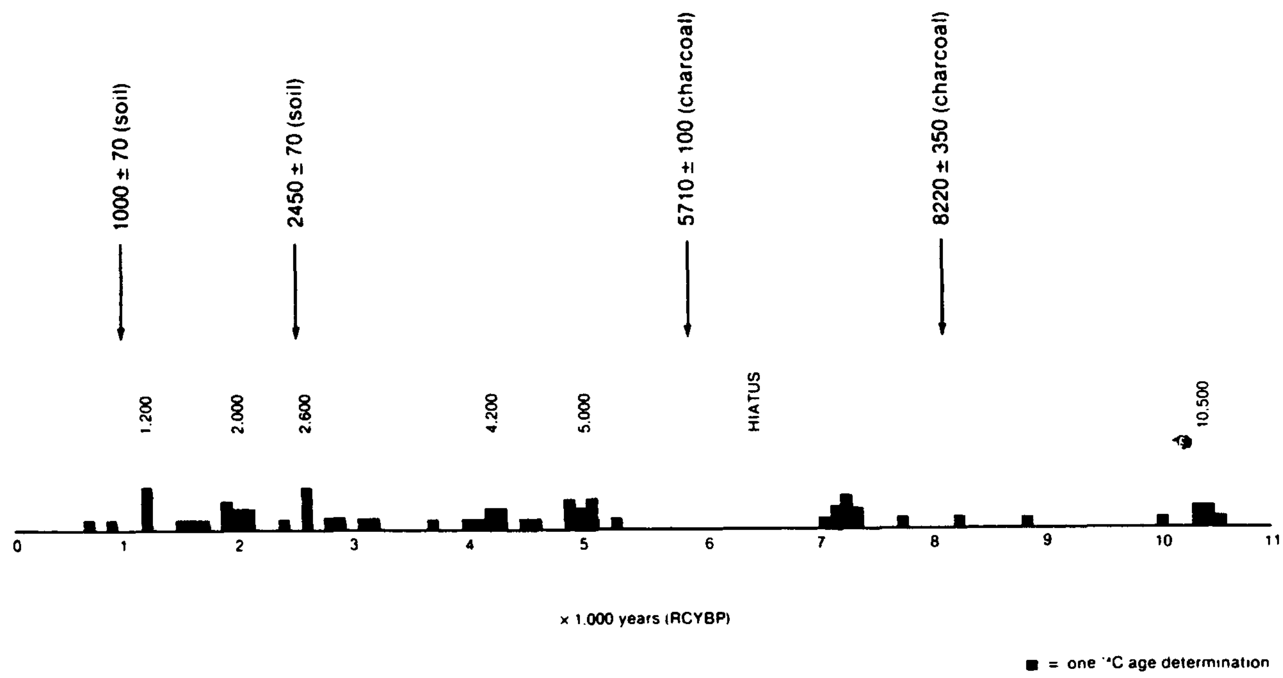


Figure 3.4. Temporal distribution of radiocarbon ages derived from the upper-most few centimeters of paleosol A horizons buried in alluvium of the Kansas River basin. The periods indicated (1,200, 2,000, 2,600, 4,200, 5,000, 7,200, and 10,500 yr B.P.) are characterized by widespread and moderate to strong alluvial soil development. The four alluvium-derived radiocarbon ages from this project are indicated by arrows. Note the middle Holocene, or Altithermal, hiatus.

which soils buried in terrace fill have not yet been dated within the Kansas River basin or those adjacent. This hiatus coincides with the Altithermal (Antevs 1955), a time of documented moisture deficit in the midcontinent. The field example nearest the project area is a cut-bank exposure along the Kansas River valley near Wamego, Kansas, which brackets the hiatus with a lower paleosol age of 7250±110 and an upper one of 4950±120 yrs B.P. At least three possibilities for the lack of dated soils exist: paleosols this age occur but have not yet been discovered or have been ignored; the record of this period has been destroyed; or valley bottoms were sufficiently unstable to permit soil development. Although some of the middle Holocene record was undoubtedly lost through erosion, channel and floodplain instability are suggested by the alluvial record in the basin (Johnson 1988). This coupled with reduced moisture for soil formation probably created the hiatus.

The radiocarbon ages obtained from alluvium in the project area are indicated on Figure 3.4. The 1000±70 yrs B.P. age from 14JF410 falls loosely within the younger grouping. The other age, 2450±70 yrs B.P., from a buried A horizon (14JF482) occurs near the 2600 yrs B.P. clustering. Both radiocarbon ages approximate the times of major soil development. It must be borne in mind that the ages would be slightly younger and comparable to those plotted if the assayed samples had been collected from the uppermost, rather than lowermost, A horizon of the buried soils from this study. The other two radiocarbon ages of 8220±350 and 5710±100 yrs B.P. are <u>not</u> from buried soils and occur within episodes during which alluviation seems to have been predominant in the Kansas River basin and elsewhere in the east-central Great Plains (Johnson and Logan, 1990). The consistency of the four alluvial radiocarbon ages from the project area with the record of the Kansas River basin is evident in the record of alluviation and degradation (Fig. 3.5).

Research in stream basins elsewhere in the central Great Plains has produced temporal patterns very similar to those of the Kansas River basin, and the Delaware River system specifically. Mandel (1987b) recorded two periods of soil development in the Pawnee River basin of central Kansas: formation of the Hackberry Creek paleosol from about 2800 to 2000 yrs B.P. and the Buckner Creek paleosol about 1600 to 1000 yrs B.P. Entrenchment of the channel occurred shortly after 1000 yrs B.P. In the East Branch Walnut River of south-central Kansas, Artz (1983) documented valley-wide aggradation from about 4500 to 2000 yrs B.P. Slowed aggradation permitted soil development soon after 2000 yrs B.P. on surfaces presently situated as T-1 terraces. A major soil-stratigraphic unit, the Copan paleosol, was recognized throughout the upper Verdigris River system of northeastern Oklahoma (Hall 1977a, 1977b; Reid and Artz 1984). The paleosol developed sometime between 2000 and 1350 yrs B.P.

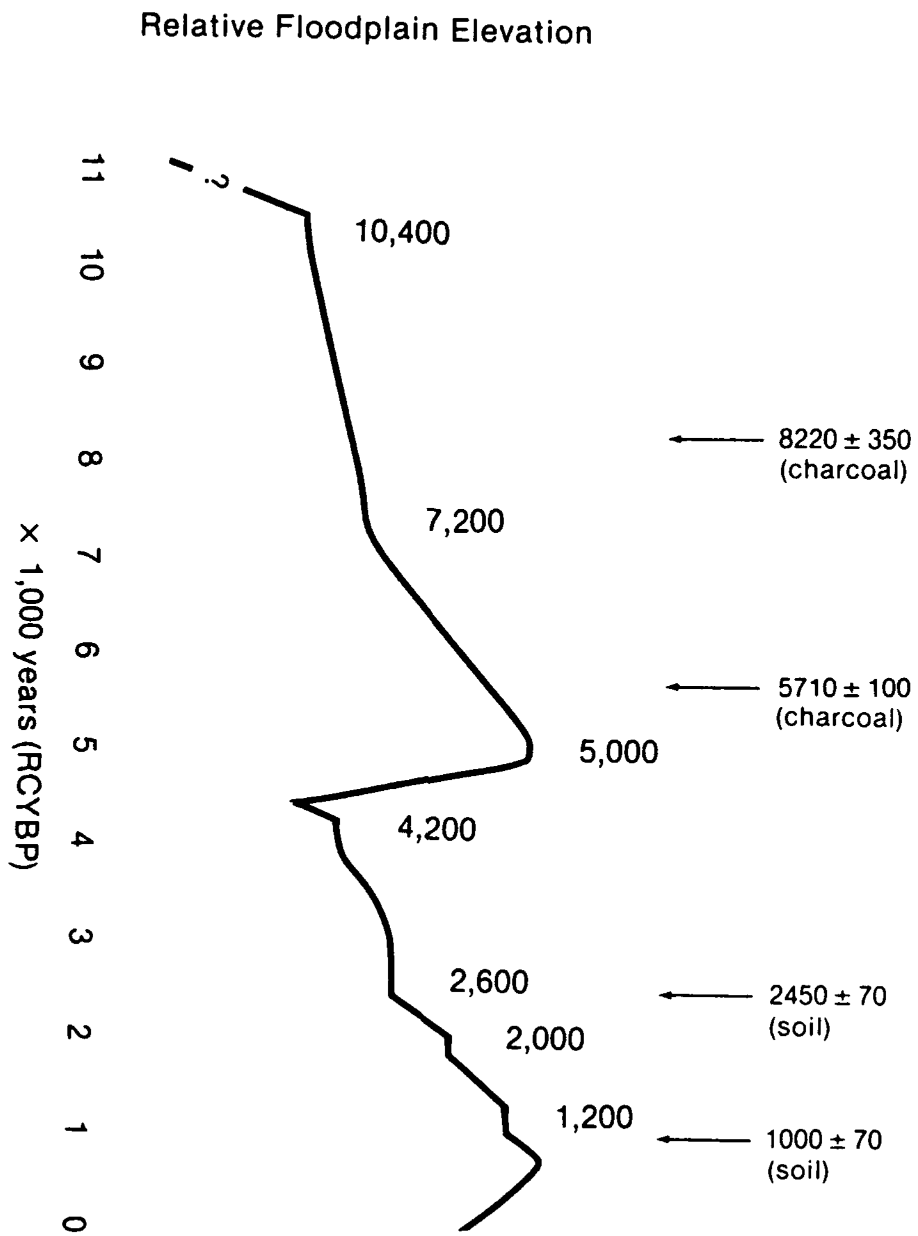


Figure 3.5. The sequence of alluviation and degradation as recorded in the alluvial stratigraphy of the Kansas River basin. The four alluvium-derived radiocarbon ages from this project are indicated by arrows.

Ferring (1986a) recognizes a paleosol of the same age in Delaware Canyon of southwestern Oklahoma. Working in the Osage River valley of west-central Missouri, Lees and others (1982) bracketed the formation of a buried soil in T-1 fill between 3000 and 1500 yrs B.P. In northwestern Missouri, Mandel (1985) noted that T-1 fill of the Little Blue River accumulated between approximately 8000 and 2000 yrs B.P. All these studies support the limited data from the Delaware River and show very good temporal agreement with the composite record of the Kansas River basin. This synchroneity provides strong evidence for climatic forcing on a regional, or subcontinental, scale (Brackenridge 1980; Wendland 1982; Knox 1983). This is not, however, to exclude the documented importance of geomorphic (intrinsic) controls on stream behavior (e.g., Schumm 1973; Patton and Schumm 1981).

The Missing and Disturbed Record: As Ager (1973: 34) states, "The sedimentary pile at any one place on the Earth's surface is nothing more than a tiny and fragmentary record of vast periods of Earth history." The same observation has been lucidly stated by Bettis and Benn (1984), Gladfelter (1985), and others, but in an archaeological context. When the history of landscape evolution stored in alluvium is scattered and with gaps, as is usually the case, the process of reconstructing events and their chronology can sometimes be very difficult and conceptualized only in a very general way.

Based upon available stratigraphic information, major vertical adjustments in the stream channels have not occurred within most of the basin during the last 1000 years. Ample time has subsequently been available for lateral migration which could potentially expand the width of the meander belt, creating floodplain at the expense of older terraces and fills containing in situ cultural materials.

For many years collectors found artifacts, particularly projectile points, on gravel bars in the Kansas River and major tributaries. Many reported finds were of Paleoindian points, for example, Clovis, Hell Gap, Milnesand, and Meserve/Dalton types (Rogers and Martin 1982, 1983). Such finds have also been made in the Delaware River (Reichart 1973, 1985). In fact, most Paleoindian points reported were recovered from gravel bars, as "cultural lag," and on high terraces (Brown and Logan 1987). Given their antiquity, Paleoindian points are usually buried, often deeply, such as at the Sutter site of northeastern Kansas (Katz 1971, 1972), and will only appear after being eroded from a stream cut and subsequently deposited on a gravel bar.

Soil Geomorphic Relationships

Dickey and others (1977) provided a detailed soil survey for Jefferson County. Soil data obtained in this study were

used, in concert with the published county soil survey, to establish and verify soil-geomorphic relationships. In most instances there is a relatively close association between soil series and landscape position. There are, however, numerous discrepancies in the expected patterns of soil distribution. Several factors can account for these deviations. For example, county soil surveys, published by the Soil Conservation Service, are comprised of maps with varying degrees of generalization; similar soils on differing landscape surfaces may be grouped into a single soils series. Also, inaccuracies may exist due to insufficient ground truthing during the mapping of the soils. Alluvial landscapes are particularly problematic because of such complications as masking by alluvial fans and colluvium masking, historical aggradation, and the variation in soil drainage (e.g., natural levees vs. backwater swamp areas). These limitations not withstanding, the soil surveys have high potential for landscape interpretation; the project area is no exception.

Soil-geomorphic relationships in the Delaware River valley are illustrated in Figure 3.6 and listed in Table 3.2. Not all soil series occurring within the county are represented here, only those predominant in the central and northern portion of the project area, where this research was focused. Further, representative profiles for each of the soil series are summarized in Table 3.3. The Pawnee clay loam is a deep, ridge-top soil forming in fine-textured glacial till and glaciofluvial deposits, pre-Illinoian in age ("Kansan" according to the largely abandoned, but classical, glacial nomenclature). Grundy silty clay loam soil developed on the uplands in the loess mantle. They tend to have a very dark (black) A horizon and well-developed textural (Bt) horizon. Shelby soils, usually mapped as the Shelby-Pawnee complex are loamy and, like the Pawnee, developed in the pre-Illinoian glacial till and glaciofluvial deposits outcropping on the uplands. They differ from the Pawnee in that they formed on the moderately to strongly sloping, rather than gently sloping, upland surfaces. The Sogn series, a shallow silty clay loam, developed within material weathered from limestone bedrock in moderately sloping to moderately steep slopes. It typically consists of an A1 and A2 horizon over weathered bedrock; the solum is only about 33 cm thick. Another fine-textured soil, the Vinland silty clay loam, develops from weathering shale parent material on moderate to steep upland slopes. The Martin silty clay loam is a gently to moderately sloping soil on side slopes and foot slopes below Pawnee and Vinland soils. It developed from weathering of moderately-fine and fine-textured shale. All the above soils have developed in "upland" landscape positions. Therefore, they are bedrock-derived or formed within sediments deposited before prehistoric cultural activity, as we now perceive it. The late-Pleistocene, or Peoria, loess and any possible Holocene, or Bignell, loess

may, however, be exceptions in that Paleoindian and Archaic materials could have been buried by loess fall such as apparently occurred at the Hermann site in eastern Missouri (Sorenson and Schmits 1985).

The remaining soil series in the basin associate with the valley-fill deposits and are much more likely to contain buried prehistoric cultural material; in fact, it is more likely buried than not in most instances. The Gymer soil, a silt loam, fits somewhere in between the upland and bottomland soils categorization. It formed in silty sediments and has been mapped in both "old alluvial sediment" (Dickey et al. 1977:65) in Douglas County on the east and in loess (Abmeyer and Campbell 1970) in Shawnee County on the west. Although not specified in the county soil survey, the parent material of the Gymer in Jefferson County is apparently loess, where it is colluvially redeposited at the base of slopes and capping the high terrace. Sorenson and others (1987) noted the Gymer soil is commonly associated with the surface of the Buck Creek Terrace in the lower Kansas River valley.

Wabash soils are nearly level and poorly drained, formed in backwater areas of high floodplains and low terraces, primarily the latter. They developed in clayey alluvium, tend to be very dark throughout, and are gleyed usually about 40-50 cm or less below surface. Reading soils, developed on the high bottoms and low terraces in silty alluvium, are typically found in well-drained areas adjacent to Wabash soils. The Reading series exhibits a well-developed textural B (Bt) horizon, which indicates some antiquity. Both the Wabash and Reading soils are associated with the low terrace, but are overlain in some locations by a Kennebec soil formed in recent overbank alluvium. The Reading and Wabash soils are commonly associated with the Newman terrace in the lower Kansas River valley (Sorenson et al. 1987). The Kennebec soils occupy the lowest topographic position in the project area, i.e., on floodplains. They are nearly level and relatively well-drained soils developed in silty alluvium. The profile is a simple A-C sequence, but the entire A horizon can be quite thick (1-2 m). Stratification is common in the soil due to the high frequency of flooding by overbank flow. As noted above, they can form in recent alluvium deposited on Reading or Wabash soils developed on the low terrace. Where the floodplain has been deposited in recent decades or centuries, it exhibits meander scrolling; these areas are designated as the Kennebec channeled soils.

As Figure 3.6 and Table 3.3 suggest, the toposequence, or systematic progression of soils from the highest uplands to the floodplain is a well-ordered succession. In the Delaware River valley, the trend in soil development is that of increasingly stronger soil development from the floodplain to the high terrace and beyond. As soil age increases,

Table 3.2. Soil Geomorphic Relationships in the Project Area.

Soil Series	Texture	Soil Classification	Parent Material	Landscape Position
Pawnee	clay loam	Aquic Argiudoll	Glacial till and glaciofluvial deposits	Uplands
Grundy	silty clay loam	Aquic Argiudoll	Pleistocene loess	Uplands
Shelby	loam	Typic Argiudoll	Glacial till and glaciofluvial deposits	Uplands
Sogn	silty clay loam	Lithic Haplustoll	Limestone	Uplands
Vinland	silty clay loam	Typic Hapludoll	Shale	Uplands
Martin	silty clay loam	Aquic Argiudoll	Shale	Uplands
Gymer	silt loam	Typic Argiudoll	Pleistocene loess and alluvium	High terraces
Wabash	silty clay loam	Vertic Haplaquoll	Holocene alluvium	Low terraces & floodplains
Reading	silt loam	Typic Argiudoll	Holocene alluvium	Low terraces
Kennebec	silt loam	Cumulic Hapludoll	Holocene alluvium	Low terraces & floodplains
Kennebec (channeled)	variable	Cumulic Udifluvent	Holocene alluvium	Floodplains

Table 3.3. Representative Profiles of Soils Occurring in the Project Area (after Dickey *et al.* 1977).

Soil Series	Horizonation	Thickness (cm)	Soil Series	Horizonation	Thickness (cm)
Pawnee (silt loam)	Ap	20	Gymer (silt loam)	A	28
	AB	15		BA	15
	Bt	38		Bt1	18
	BC	38		Bt2	33
	C	41		BC	58
Grundy (silty clay loam)	Ap	20	Wabash (silty clay loam)	A2	18
	Ap	15		A2	33
	Bt1	10		Bwg1	48
	Bt2	38		Bwg2	13
	Bc	53		C	94
	C	84			
Shelby (loam)	A	30	Reading (silt loam)	Ap	18
	BA	15		A	18
	Bt	36		BA	25
	Bc	41		Bt	30
	C	30		BC	40
				C	56
Sogn (silty clay loam)	A1	23			
	A2	10	Kennebec (silt loam)	A1	61
	R	33		A2	46
				C	76
Vinland (silty clay loam)	A	20			
	Bw	10	Kennebec channeled:	similar to Kennebec but greater textural range and more stratification	
	C	10			
	R	41			
Martin (silty clay loam)	Ap	23			
	BA	8			
	Bt1	13			
	Bt2	23			
	Bt3	33			
	BC	53			
	C	28			

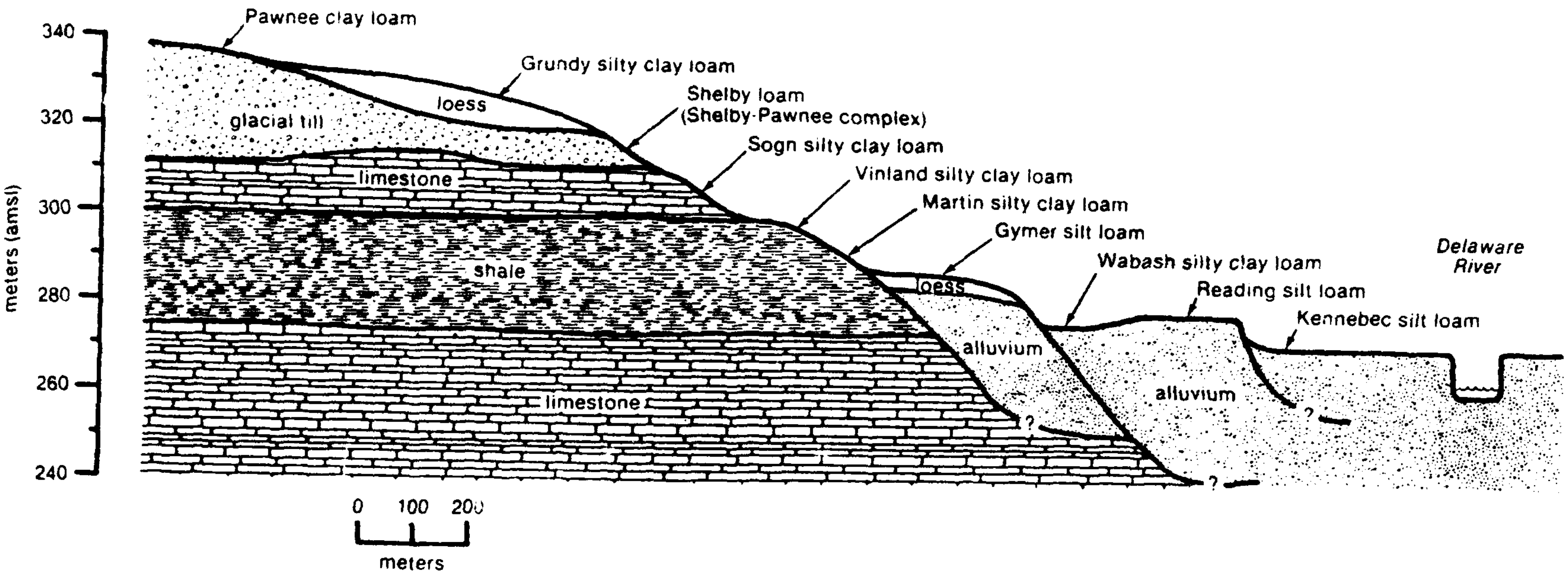


Figure 3.6. A schematic cross-section of the Delaware River valley, illustrating the topo- and chronosequence of soils and associated parent materials.

colors become redder due to increased oxidation and B horizons better developed and thicker. Departures from this simple model occur frequently due to deposition of colluvium and recent alluvium over older soils and other events, but overall the soils exhibit a meaningful chronosequence, particularly in the valley fill.

Summary and Conclusions

This chapter has presented a general discussion of the landscape, particularly soil-geomorphic relationships and chronologies, as they relate to prehistoric occupation. The project area includes numerous landscape elements ranging in age from Pleistocene to latest Holocene.

Quaternary geology of the Delaware River basin and project area offers a wide array of earth materials: pre-Illinoian glacial till and glaciofluvial sediments, Pleistocene- and perhaps Holocene-age loess, and Holocene and older alluvial valley fills. Because the project area includes only upland landscapes proximal to the Delaware River valley, the archaeological potential of the loess-mantled uplands is largely unknown. The focus on the valley landscape has determined there are at least two alluvial terraces and a floodplain. They have been defined, in order of decreasing elevation and age, T-2, T-1, and T-0. The T-2, or high, terrace is probably equivalent to the Buck Creek terrace of the lower Kansas River valley, perhaps of late Pleistocene age. Limited radiocarbon data obtained from T-1, or low, terrace fill in this study indicates it is correlative with the Newman and Holliday terraces of the lower Kansas River valley. A well-developed alluvial soil is commonly found buried .5-2 m beneath the surface of the low terrace. Two ages of fill comprise the floodplain, those stable for up to 1000 years and others created during recent, even historical, lateral migration of the channel. Regional correlations prove helpful in understanding the alluvial history of the project area.

The geomorphic analysis of the project area has been built around the establishment and use of soil-geomorphic relationships. This approach greatly facilitates the development of a geoarchaeological model, i.e., an articulation of the relationship between culture periods and landforms/landscapes. A model of culture period-landform associations provides a general framework within which to consider the taphonomy of prehistoric settlement, which to a large degree influences the patterns perceived. This chapter has dealt with the loess mantle, bedrock, glacial till and glaciofluvial sediments, and the alluvial surfaces and fills of the valleys. Although much of the cultural record has been lost or disturbed, some remains exposed on the surface, but much more is buried, apparently deeply (e.g., 14JF409). A qualitative expression of the probability, or potential,

for realizing cultural materials buried *in situ* can be made by comparing culture periods against basic landscape elements (Table 3.4; cf. Pettis and Benn 1984: 223). Floodplains in the region are typically less than 1000 years old, low-terrace fill is generally middle to late Holocene, and high-terrace fill, latest Pleistocene to middle Holocene. While it must be re-emphasized that the existence of the same terrace and fill system throughout a basin the size of the study area is highly unlikely, this investigator's experience and data reported by others suggest the two most pronounced terraces (T-1, T-2) often produce individually consistent and bracketing ages from their fills.

Investigation of the stratigraphic context of prehistoric sites in the Delaware River basin has, of course, far to progress. Available geomorphic and archaeological evidence only indicates the need for additional research in order to more accurately understand the relationship between stone age populations and their landscapes, and the relationship between the archaeological record and ongoing geomorphic processes. This understanding will come only through an emphasis on radiometric dating in order to establish the absolute chronology of the various landforms in the project area.

Table 3.4. Probabilities for the Existence of Cultural Materials Buried In Situ Beneath Geomorphic Surfaces Within the Project Area.

	Landform						
Cultural Period (time range in yr B.P.)	Floodplain (T-0)	Low Terrace (T-1)	High Terrace* (T-2)	Upland (Peoria loess)	Upland (Loveland loess)	Upland (Glacial till)	Upland (Bedrock residuum)
Historic (<250)	H	O	O	O	O	O	O
Protohistoric (650-250)	M	O	O	O	O	O	O
Plains Village (1,150-650)	L	L	O	O	O	O	O
Plains Woodland (2,000-1,150)	O	H	O	O	O	O	O
Late Archaic (5,300-2,000)	O	H	O	O	O	O	O
Middle Archaic (7,000-5,300)	O	H	O	O	O	O	O
Early Archaic (9,000-7,000)	O	H	L	L	O	O	O
Paleoindian (12,000-9,000)	O	L?	M	M	O	O	O

* Without a loess mantle

Probability of cultural material buried in situ

O none
L low
M moderate
H high

Chapter 4

REGIONAL CULTURE HISTORICAL BACKGROUND

Brad Logan

Introduction

Human occupation of the Delaware River drainage spans a period of at least 12,000 years. From the waning years of the Late Pleistocene to the present time the project area has been the setting of a variety of cultural adaptations including those of hunter-gatherers, hunter-gatherer-gardeners, and modern farmers. What follows is an outline of that occupation that focuses primarily on the prehistoric periods. This emphasis reflects the fact that only one of the 17 sites investigated during this project contained an historic component which was to be evaluated for its National Register eligibility.

The outline includes descriptions of each period in terms of its diagnostic artifacts, features and structures. However, archaeologists distinguish these periods primarily on the basis of changes in material culture assemblages, technologies, settlement patterns and subsistence economies. These are seen as reflections of the dynamic relationships among human groups and between those groups and their physical surroundings. The prehistoric occupation of the Delaware River basin occurred during a time of significant changes in the social and natural environments of the Central Plains. The archaeological record of the study area as described below and augmented by this report is testimony to the resilience of culture, that unique adapation of humans that enables them to successfully respond to such changes. Figure 4.1 provides an outline of the cultural-temporal periods recognized in the Central Plains in general, and northeastern Kansas in particular, with reference to their associated settlement-subsistence adaptations.

<u>Paleoindian</u> (ca 12,000-10,000 B.P.): The earliest evidence of humans in northeastern Kansas coincides with the late Wisconsinan glaciation some 12,000 years ago. At that time the Great Plains was populated with small, nomadic bands of hunter-gatherers that were dependent primarily on such now extinct large animals as mammoth (<u>Mammuthus jeffersoni</u>) and bison (<u>Bison antiquus</u>). Paleoindian sites with associations of skeletal remains of these animals and the tools used to dispatch and butcher them, such as those found in the High Plains (Frison 1978; Haynes 1964, 1969, 1970; Rogers and Martin 1984; Wormington 1957) and, to a lesser extent, in the eastern woodlands (Graham 1981), have not been discovered in the project area. However, there is evidence in the form of temporally diagnostic projectile points that these big game hunters were in the project area and its vicinity.

Figure 4.1. Chronology of Northeastern Kansas Culture History.

Period	Temporal Range	Regional Cultures	Settlement-Subsistence
Historic	ca. 300 BP to present	Euro-American; Delaware, Kickapoo, Shawnee; Kansa	Permanent rural-urban industrial-farmers; permanent farmers; semi-sedentary hunter-gatherer-gardeners
Protohistoric (Late Ceramic)	ca. 550 to 300 BP	Oneota	Semi-sedentary hunter-gatherer-gardeners
Plains Village (Middle Ceramic)	ca. 1000 to 500 BP	Pomona variant (Apple Valley, Clinton, Maybrook phases), Steed-Kisker, Nebraska phases	Semi-sedentary hunter-gatherer-gardeners
Woodland (Early Ceramic)	ca. 2500 to 1000 BP	Grasshopper Falls, Wakarusa, Deer Creek phases; Kansas City Hopewell variant; Traff phase?	Semi-sedentary hunter-gatherers (gardeners?); Sedentary hunter-gatherers (KC Hopewell only); mobile hunter-gatherers?
Archaic	ca. 10,000 to 2500 BP	Nebo Hill, Black Vermillion, Munkers Creek, Dalton phases	Seasonally-mobile hunter-gatherers
Paleoindian	ca. 12,000 to 10,000 BP	Plano; Folsom; Clovis	Mobile big-game hunters and gatherers
Pre-Clovis	before 12,000 BP	?	?

Isolated finds of Paleoindian points (Clovis, Folsom, or Plano types) have been recorded in the Delaware River basin (Witty 1964; Reichart 1972), in the lower Kansas River valley (Rogers and Martin 1982, 1983), near Highland in Doniphan County (Wedel 1959:176-179), in Tuttle Creek reservoir near Manhatten (Solecki 1953; Schmits 1978), in the Delaware River basin (Witty 1964), and on Plum Creek near Kickapoo, Kansas (Logan 1981).

<u>Archaic</u> (ca. 10,000 - 2500 BP): With the demise of late Pleistocene megafauna some 10,000 years ago, the hunters of the Great Plains shifted to the hunting of modern game such as deer, elk, and bison (<u>Bison bison</u>) and a greater dependence on wild plant foods. Cleland (1976) has described the Paleoindian to Archaic subsistence shift as a change from a focal economy to one more accurately described as diffuse. Archaic settlement sites indicate a shift toward seasonal exploitation of resources in local microenvironments and, in the lower Missouri and Kansas River region, at least by the late Archaic, the establishment of an annual round focused on forest-riverine and upland prairie resources.

Evidence of a transitional Paleoindian to Archaic culture complex known as Dalton (10,000 - 9,000 BP) has been found in northeastern Kansas and northwestern Missouri. The center of this complex is the southeastern part of the United States and the study area lies on its northwestern periphery (Chapman 1975). Sites in the Dalton core area reflect a woodland-riverine adaptation with hunting of deer and raccoon and harvesting of hickory nuts and black walnuts (McMillan 1976; Logan 1952; Morse 1973; Morse and Goodyear 1973). Distinctive Dalton bifacial stone tools, also referred to by some archaeologists as Meserve points, have been found in the Central Plains (Logan 1979; Jolly and Weeks 1978; Myers and Lambert 1983). At least two artifacts of this type have been reported in the study area (Reichart 1974, 1985).

Other information on Early Archaic inhabitants of northeastern Kansas comes from the Sutter site (14JN309) on Muddy Creek in Jackson County. Evidence from this site, buried by some 30 feet of deposits, resulted in recovery of lanceolate and square-stemmed projectile points and other tools comparable to the Frederick and McKean complexes of the High Plains (Katz 1971). Radiocarbon dates from the site cluster between 7500-8000 BP (Katz 1972). The deep burial of cultural material at the Sutter site suggests other Early Archaic sites in alluvial settings in the project area may occur in similar geomorphic contexts.

The Middle Archaic (ca. 7,000 - 5,000 BP) coincides with the Hypsithermal (King 1980) or Atlantic (Bryson <u>et al</u>. 1970) climatic episode. In northeastern Kansas, this episode brought about an expansion of prairie and a corresponding recession of the upland and/or riverine woodlands (Gruger

1973). Perhaps as a response to this environmental change, Archaic hunter-gatherers adopted an economic strategy based on the use of a wide variety of plant and animal resources available in aquatic, flood plain forest, and floodplain prairie communities. Evidence of the practice of this diffuse economy has been found at the Coffey site (14PO1), in the Big Blue River basin north of Manhattan, Kansas (Schmits 1978). This site was occupied during the late Altithermal, a time of initial woodland re-expansion, about 5055 to 5270 BP (Schmits 1978:85). At the time of its occupation, the site was near the margin of an oxbow lake. Artifacts recovered include lanceolate bifaces, basal-notched and corner-notched projectile points, gouges, axes, groundstone manos, and metates.

Witty (1982b:218-219) assigns the cultural zones in Horizon III at the Coffey site to the Munkers Creek phase. This complex, as defined by Witty (1982b), is recognized at sites containing habitional features such as hearths, shallow pits and postholes in association with such diagnostic artifacts as lanceolate-shaped Munkers Creek dart points; Munkers Creek knives (elongate, asymmetrical bifaces with occasional evidence of "sickle polish"); gouges and chipped stone axes. Although the Munkers Creek phase is distinct from the Nebo Hill complex (see below) in its lack of any ceramic pottery technology, the earliest examples of the use of fired clay as an artistic medium date to the Munkers Creek phase. These examples consist of small human effigies recovered at the William Young site, type site of the phase, in the Council Grove Lake area (Witty 1982b:124-126). Sites of the phase generally occur in floodplain settings along major streams in the Flint Hills and western Osage Cuestas of eastern Kansas. Tools and food remains indicate a generalized hunting and gathering economy characteristic of other Plains Archaic adaptations. Based on radiocarbon dates from the Coffey and William Young sites, the temporal span of the Munkers Creek phase was suggested to be from 3500 to 3000 B.C. (ca. 5450-4950 B.P.; Witty 1982b:219).

The trend toward increasing sophistication in the use of forest-riverine resources in the lower Kansas and Missouri River region continued during the Late Archaic (ca. 5,000 - 2500 BP). In northwestern Missouri and northeastern Kansas, this period is represented by the Nebo Hill phase. Sites of this complex include the Nebo Hill type site (23CL11), on a bluff top overlooking the Missouri River in Clay County, Missouri (Reid 1980a and 1984); the Sohn site (23JA110), a camp site on a terrace along the Little Blue River (Reeder 1978, 1980); extensive upland sites of Turner-Casey (23JA35) and 23JA170, also in the Little Blue valley (Brown 1977; Schmits 1989); and the Doherty site (14MM27), a camp site on a terrace in the upper Marais des Cynes basin in Miami County, Kansas (Blakeslee and Rohn 1982).

The Nebo Hill complex is characterized by a variety of chipped-stone and groundstone tools and the earliest known pottery in the region (Reid 1984). The most distinctive artifacts of the lithic assemblage are finely retouched, lanceolate bifaces that served as dart points and cutting tools (Shippee 1948, 1957). Side-notched and corner-notched dart points also occur as a minor element of the assemblage. The Nebo Hill folk practiced a seasonally-determined settlement pattern with late summer through fall occupation of bluff tops by aggregates of bands that utilized the resources of the nearby upland forest and prairie communities, as well as the floodplain and aquatic zones. Primary dependence was on deer and black walnuts. During winter months the groups apparently dispersed into bands which occupied small, lowland camps (Reid 1980).

Woodland (ca. 2500 - 1000 BP): The Early Woodland period (ca. 2500 - 2000 BP) is not known in northeastern Kansas and has only recently been recognized in northwestern Missouri. At present, only three sites of this period are known and all are in the Little Blue River valley. These include the Traff site (23JA159, Wright 1980), 23JA36, and 23JA40 (Brown and Ziegler 1985). Assignment of these sites to the Early Woodland is based on the presence of Morton complex ceramics and/or radiocarbon dates. Sites of this period are not expected in the project area.

The Middle Woodland period in the lower Kansas River basin is represented by the Kansas City Hopewell complex (ca. 2000 - 1200 BP; Wedel 1943, 1959). The Kansas City Hopewell differed in several dramatic respects from their Late Archaic and Early Woodland predecessors in the area. The former were so proficient in utilizing the resources of the oak-hickory forest community that they were able to occupy village settlements on a permanent basis. These villages (e.g., the Renner (23PL1) and Young (23PL4) sites) are generally situated near the mouths of tributaries to the Missouri River. Smaller, short-term camps, probably ancillary to the village, are located in their vicinity (Johnson 1976). Other major sites of this complex include the Aker site (23PL43), a village site on the floodplain east of Leavenworth; the Kelley site (14DP11, Katz 1969), a small camp on Squaw Creek in Doniphan County, Kansas; the Trowbridge site (14WY1, Bell 1976), a major village in the interfluve region near the confluence of the Kansas and Missouri rivers; and the Perry site (14JF314), a village site on a remnant of the Newman Terrace in the Kansas River valley south of Perry, Kansas. The proximity of the last site to the project area suggests some evidence of the Kansas City Hopewell complex may be found at sites in the Perry Lake Project Area.

Artifacts diagnostic of Kansas City Hopewell include large, elongate ceramic jars with subconical bases. These

vessels are tempered with sand, grit, sherd, or a combination of these materials (Katz 1974). Exterior surfaces are plain, and rims and shoulders are decorated with a variety of designs, including cross-hatched incisions, rocker-stamped marks, hemiconoid punctates, or lip notches (Wedel 1943, Chapman 1980). These designs varied through time and have been arranged in a chronological seriation (Johnson and Johnson 1975). Lithic artifacts include corner-notched and contracting-stemmed dart points, blocky end scrapers, drills, gouges, chipped-stone and groundstone celts and axes, and utilized bladelets. Faunal remains, such as turkey bones and deer metapodials and antlers, were also modified for use as awls, punches, beamers, and flaking tools. Sedentary occupation of village sites is suggested by the presence of trash-filled storage pits and thick midden deposits. Stone-lined, earth-covered burial mounds located on bluff tops near some of the larger settlements are another salient feature of this complex (Wedel 1943; Shippee 1967; Larsen and O'Brien 1973; Tjaden 1974).

Although the center of the Kansas City Hopewell culture was near the confluence of the Missouri and Kansas rivers, sites with such a Middle Woodland affiliation occur throughout northeastern Kansas. The occurrence of Hopewellian traits in more traditional Plains Woodland assemblages, as well as the spatial and temporal overlap of these complexes, suggest that the Kansas City Hopewell influenced the development of later Woodland groups in this region (Johnson 1983). Two variants of the Plains Woodland pattern that was established by 1300-1200 BP are recognized in the project area or its immediate vicinity. These are the Grasshopper Falls phase, centered in the Delaware River drainage, and the Wakarusa phase, which occurred in the Wakarusa River drainage. A third, tentatively identified phase, the Deer Creek phase, has also been suggested for the latter area.

The Grasshopper Falls phase is defined from three excavated sites, Malm (14JF307), Anderson (14JF331) and Teaford (14JF333), in the Perry Lake area of the Delaware River (Reynolds 1979). This phase is characterized by small settlements located on terraces along or near secondary streams. Evidence of house structures at the excavated sites occur in the form of postmolds that outline what are inferred to have been oval-shaped, grass and daub covered lodges. Temporary occupancy is suggested by sparse amounts of daub and lack of interior hearths (Reynolds 1979:104). The material culture of the Grasshopper Falls phase groups included medium to large pottery vessels in the form of wide mouthed, conical based jars. Exterior surface treatment of these vessels was cord-marked, cord-marked with partial smoothing, smoothed-over, or brushed. Temper consists of dense amounts of angular grit, and rim decoration of any sort is rare. Lithic artifacts are similar to those of the Kansas

City Hopewell, but with the significant addition of the corner-notched arrow point, a trait that first appeared in the region late in the Middle Woodland period. Settlement sites consisted of a small number of structures, each large enough for a nuclear family. Subsistence was based on hunting and gathering, although floral and faunal evidence of the exact nature of those practices was sparse at the excavated sites. No direct evidence of the practice of horticulture has yet been found. Mortuary practices are poorly known at this time. Investigations of Grasshopper Falls phase sites have thus far revealed a single instance of human burial, that of an infant in a small, central sub-floor basin in a habitation structure at 14JF350 (Barr 1971). Either a long duration of occupancy or a large population in the Delaware basin is indicated by the presence of at least 120 recorded site components of this phase (Reynolds 1979:103).

The Wakarusa phase was defined on the basis of one excavated settlement, the Kampschroeder site (14DO27), which was on a terrace in Rock Creek valley prior to its inundation by Clinton Lake (Johnson 1968). Although structural evidence was poorly defined at this site, the presence of a few postmolds and quantities of daub were indicative of a permanent shelter of pole framework and wattle-and-daub construction. In contrast to the Grasshopper Falls phase settlements, the structure at the Kampschroeder site included a central, basin-shaped hearth. Whereas storage facilities at the former settlements were located both inside and outside the lodges, only interior storage pits were defined at the Wakarusa phase settlement. Ceramic vessels at the Kampschroeder site consisted of elongate jars with slightly out-curved, undecorated rims and rounded lips. Exterior surfaces are cord-marked or partially smoothed over. Temper consists of abundant grit and sand. Lithic artifacts are comparable to those of the Grasshopper Falls phase, although the small, corner-notched arrow points frequent at the latter were not included in the small sample of projectile points found at 14DO27.

The third, tentatively identified phase of the Plains Woodland period in the Clinton Lake area of the Wakarusa River basin is the Deer Creek phase (Johnson 1968:132-133), recognized from excavations at the Anderson site (14DO32) and the Richland site (14SH101; Logan 1987) and other surface collections from sites in the project area. The distinguishing characteristic of this phase is the presence of small, corner-notched arrow points in the lithic assemblage, which suggest a later phase than the Wakarusa.

The temporal limits of the Plains Woodland phases in northeastern Kansas are, as yet, poorly defined. No radiometric dates were forthcoming from the only excavated site of the Wakarusa phase. Two averaged and calibrated

radiocarbon dates from a crematorium at the Richland site place the Deer Creek phase at ca. A.D. 640. Two radiocarbon dates are available for the Grasshopper Falls phase, one of A.D. 760±90 from the Anderson site (14JF331; Reynolds 1979:50)) and a second of A.D. 600 from 14AT2 in the Delaware River basin (Williams 1986). General placement between A.D. 500 and 1000 for Plains Woodland phases in eastern Kansas has been suggested (Johnson 1984). The radiocarbon dates support this chronological interpretation.

Plains Village (ca. 1000 - 500 BP): Cultures of this period are distinguished from those of the Woodland period not only by distinctive lithic and ceramic assemblages but by evidence of an increasing reliance on domestic plant foods, including corn, beans, squash, and sunflowers. Although the degree of reliance on cultigens has not been satisfactorily quantified, it is believed to have been significant (Wedel 1959:627; Adair 1984). The practice of small scale horticulture in combination with a continued dependence on hunting and gathering led to a more sedentary lifestyle than that of Plains Woodland groups.

Complexes of this period that figured in the culture history of northeastern Kansas include the Steed-Kisker phase of the Kansas City locality, the Nebraska phase of the Missouri River valley from extreme northeastern Kansas northward along the Nebraska-Iowa border, and the Pomona variant, of eastern Kansas and western Missouri. Although it is known that other cultures, such as the Smoky Hill and Upper Republican phases, had contact with these contemporary groups in other areas (Steinacher 1976), evidence of this interaction has yet to be verified in the project area. Evidence of interaction between Pomona and Steed-Kisker populations, however, is apparent from the presence of ceramic wares diagnostic of both from the Keen site (14JF303) in the Perry Lake area (Witty 1983) and the Zacharias site (14LV380) near Leavenworth, Kansas (Logan 1988c, 1988d).

The Steed-Kisker phase was first recognized in the Platte River valley in northwestern Missouri (Wedel 1943). It is currently known from several settlement and burial sites in the Kansas City locality (Calabrese 1969; Shippee 1972; Chapman 1980:156-160; O'Brien 1978a, 1978b; McHugh 1980). This phase has been dated from about 1000 to 750 years ago. Certain ceramic traits show some similarity to the Middle Mississippian cultures of eastern Missouri and western Illinois. Some consider the complex a result of a migration of peoples from those areas (Chapman 1980:156) and others consider the Mississippian traits to be little more than a veneer over a typical Central Plains Tradition manifestation that developed locally (Henning 1967). Settlements of this complex consist of remains of one or two shallow pit houses of subrectangular outline. These occur on

terraces along tributary streams of the Missouri, Platte, and Little Platte rivers. Sedentism is indicated by trash-filled storage pits and the presence of extensive burial grounds near some settlements. Hunting, gathering, and horticulture are reflected in the lithic tools, faunal, and floral remains. Ceramic artifacts include shell-tempered bowls and jars with plain surfaces, a variety of incised lines or scroll designs, and appendages such as lugs or loop handles. Other artifacts include clay pipes, animal and human effigies, small, triangular, side- and basal-notched arrow points, small end scrapers, alternately beveled knives, groundstone celts and axes, sandstone pipes and shaft abraders, groundstone pipes, and worked hematite. Burials include extended, flexed, and bundle skeletal remains and associated grave goods, such as bowls and arrow points.

The Steed-Kisker phase has been suggested to have been ancestral to the Nebraska phase (Calabrese 1969). However, a number of radiocarbon dates from sites of both complexes clearly demonstrate contemporaneity, and consequently do not support the hypothesis of an ancestral relationship. In northeastern Kansas, the most southward known extent of Nebraska phase settlements is in present Doniphan County. Examples include the Nuzum site (14DP10, Wood 1969) and 14DP13 (Heavin 1970). Radiocarbon dates for the Nebraska phase range from about 900 to 525 BP (Blakeslee and Caldwell 1979:19-20). The settlement-subsistence pattern of the Nebraska phase is identical to that of the Steed-Kisker phase. Ceramics include both shell-tempered and grit-tempered bowls and jars with lug and strap handles and rim-incised designs. The presence of collared rims is perhaps the most distinguishing characteristic between the two phases. Lithic artifacts are similar to those of the Steed-Kisker phase and other Central Plains Tradition complexes. Artifacts indicative of the Steed-Kisker and Nebraska phases have been found in Stranger Creek basin, a north bank tributary of the Kansas River located just east of the Delaware River valley (Logan 1981, 1983, 1985). Ceramics characteristic of the Steed-Kisker phase have been recovered at the Keen site in the Delaware River valley (Witty 1983). These findings suggest similar evidence of these complexes may also be found in the Perry Lake area.

The Pomona variant was first defined as a focus (Witty 1967) but has recently been redefined as a variant with four recognizable phases. Core areas of all phases of the Pomona variant, as far as they are currently known, were limited spatially to eastern Kansas, although it has been suggested that western Missouri served as a resource area at certain times for some phases. One phase, defined by Brown (1985) as Apple Valley (ca. 700 - 650 BP), was centered in the Delaware River drainage. Brown (1985) suggests the populations of that phase may have used the Wakarusa drainage as a resource area. This phase is characterized by arrow points made of

local cherts and ceramics that include a high frequency of rim decoration, with knobbing being particularly diagnostic. Shell tempering of vessels always occurs to some extent in the ceramic assemblage.

Brown (1985) has suggested that the Pomona settlement pattern was a continuation of the preceding Plains Woodland and Late Archaic patterns in the same region. This was characterized by a shift between upland, warm weather settlements and lowland, cold weather sites. Our knowledge of the former sites has been hampered by the bias toward investigation of sites on terraces in valley settings. Seasonal abandonment of sites to pursue game in the mixed grass prairie to the west of the project area and in the Ozark Highland to the east (i.e., resource areas) has also been proposed as part of the Pomona settlement-subsistence pattern. Witty (1978) has suggested that the Pomona variant is a late Plains Woodland complex that was contemporaneous with Central Plains Tradition groups in eastern Kansas.

Protohistoric (ca. 550 - 300 BP): The Indians encountered in northeastern Kansas by the first Euro-Americans were the Kansa. These people were also found east of the Mississippi River in 1673 and their arrival in the Kansas and Missouri river region probably post-dates that time. What people were occupying the historic Kansa domain just prior to their arrival is presently unknown. This period is represented elsewhere in Kansas and Nebraska by sites of groups identified as proto-Wichita, proto-Pawnee, and proto-Plains Apache (Wedel 1936, 1959, 1979; Gunnerson 1960). In Missouri and Iowa, the Oneota culture has been tentatively linked to later historic Siouan groups (Henning 1970; Harvey 1979; Chapman 1980:236). In extreme southeastern Nebraska and northeastern Kansas, however, the Oneota-like manifestations at the Leary, Fanning, and Doniphan sites neither represent a well-established presence in those areas nor provide any evidence of a protohistoric link to the Kansa (Hill and Wedel 1936; Wedel 1959:131-172). Wedel (1959:171) has suggested that the Fanning site can be tentatively identified as an early Kansa manifestation, given several eastern traits in the recovered assemblage, yet he also believes it was occupied just prior to A.D. 1700 and may be evidence that corroborates the identification of the Kansa in that area on the Delisle maps of 1703 and 1718. Thus, the greater part of this period in northeastern Kansas in general, and the project area in particular, remains unknown. The apparent abandonment of the region by both Pomona and Central Plains Tradition groups may yet be linked to environmental or social changes.

Historic (ca. 300 BP to present): The historic period in northeastern Kansas is represented by its occupation from the eighteenth to the mid-nineteenth century by the Kansa (Unrau 1971). Other contemporary groups, including the

Missouri, Osage, and Pawnee are known to have traversed the Kansas River basin during hunting forays (Barry 1972). Several eastern migrant groups of Indians, including the Delaware, Kickapoo, and Shawnee, occupied reservations in northeastern Kansas from 1830 to 1865. As the name of the principal stream in the project area implies, the Perry Lake area was included in the reservation of the Delaware Indians (Goddard 1978). Prior to intensive Euro-American settlement after the Civil War, the region was explored by French and French-Canadian traders and trappers (Hoffhaus 1964, 1984; Barry 1972). Euroamerican settlement of Jefferson County began shortly after passage of the Kansas-Nebraska Act in 1854 and intensified after the Civil War (Andreas 1883; Shockley 1987).

Chapter 5

METHODS OF INVESTIGATION

Brad Logan

Methods employed during the Perry Lake Archaeological Project followed a three-phase approach. Preliminary steps to site testing included a literature search and logistical reconnaissance of the project area in May 1988. This was followed by submission of a research design (Logan 1988b) and the implementation of field work procedures. Field work occurred from July to early October 1988. Data analysis, the third phase of the project, occurred from October 1988 to May 1989. Details of each of these phases are provided below.

Preliminary Procedures

A comprehensive review of documentation resulting from all previous archaeological research in the Perry Lake project area was conducted. This entailed a review of reports, maps, field notes, and site survey files at the University of Kansas, Museum of Anthropology in Lawrence and the Kansas State Historical Society in Topeka. In addition, aerial photography of the project area was reviewed at the Perry Lake Project Information Center in order to locate sites, determine the nature of their present environmental settings, and determine the best means of approaching them.

Officials at the Perry Lake Project and Kansas Wildlife and Parks were notified of the nature of the investigations and time of their occurrance. They were asked about the location of each site, how they were best approached, and what farmer (if any) had leased land which the sites to be tested occupy.

Field Investigation Procedures

Archaeological field methods varied somewhat for each of the sites tested during the project. However, certain techniques were standard for all sites. Each site was intensively surveyed by the field crew in transects that generally were no more than three meters (10 ft) apart. All cultural material was marked with pin flags in order to determine the extent of the site. When vegetation limited artifact visibility, shovel tests were dug. These tests measured at least 30x30 cm and 30 cm in depth, sufficient to penetrate any zone of agricultural disturbance.

Once located, the site boundaries were then paced off, the area estimated in units of square meters, and an appropriate sample size of excavation units for the site calculated. The number of units was based on both the areal extent of the site and the abundance of cultural material.

Units were placed in areas that contained greater densities of cultural material in the belief that these surface conditions reflected similarly high quantities of subsurface deposits. The quality as well as the quantity of artifacts on the surface was also taken into account when considering the placement of test units. For example, clusters of burned limestone might represent a hearth, a portion of which might yet remain undisturbed below the plow zone. Similarly, a concentration of daub on the surface might indicate a habitation that had been partially disturbed by plowing. Such clusters or concentrations were selected for testing.

Surface artifacts diagnostic of either a culture complex or a time period, and formal tools that reflected specific activities such as hunting, food processing, or social interaction, were not only pin-flagged, but mapped with respect to a datum, or fixed point of reference. These artifacts were also collected and later cataloged with reference to their specific provenience.

A datum, consisting of a 5-foot-long tube of white PVC plastic, was placed at each site for mapping purposes. The locations of all diagnostic surface artifacts, test units, and backhoe trenches were mapped with respect to this datum. Similarly, each site was mapped topographically from such a reference point with an infra-red transit. Distances and elevations measured at the tested sites with this instrument are accurate to within one-tenth centimeter. Each datum is intended to be permanent and useful for future investigations by other professional archaeologists. Thus, each datum was buried to at least one-half its height in a place considered to be a safe distance beyond the farming activities of tenants or any other potential hazard yet easily found by future investigators.

Excavation units were $1m^2$, although two such squares were sometimes contiguous, forming 2x1m units. After careful excavation and screening of the plow zone, these units were dug in 10 cm levels. In some cases where plowing was not apparent, units were entirely excavated in 10 cm levels. Test units were dug to depths sufficient to determine the vertical extent of cultural deposits. At sites where deeply buried cultural remains might exist, short trenches (generally three meters long) were excavated with a backhoe. Trenches varied in depth, depending on the nature of the deposits (i.e., alluvial or residual) but those excavated in alluvium were at least two meters deep. All test units and trenches were inspected not only by an archaeologist but also by the project geomorphologist, who recorded the nature of all soils and sediments.

It was not deemed essential to excavate all units until a completely sterile level had been encountered during this particular project. The rationale for this is based on an

understanding of the nature of the soils prevalent throughout much of northeastern Kansas and the effect of some aspects of these soils on the post-depositional history of cultural deposits. All of the sites investigated during this project occurred in soils that have developed in alluvial deposits or in upland residual deposits (see chapter 3). The structure of these deposits is generally characterized by higher clay content with increased depth. These soils have high shrink-well capabilities which result in the opening and closing of cracks during fluctuations in precipitation. The appearance of dessication (drying) cracks in such soils has been demonstrated to result in the downward dislocation of artifacts (Wood and Johnson 1978). In the project area, cracks of this nature were encountered in excavation units at several sites (see chapters 6 and 10). Given this property of the soils throughout the project area, it would be possible to encounter cultural materials at depths well below their level of origin. Consequently, continued excavation of a unit until no artifacts were recovered would not necessarily provide data essential for determining the National Register eligibility of a site. During the Perry Lake Archaeological Project, determination of the vertical extent of cultural deposits was based on the recording of taphonomic features as dessication cracks, crotovinas (filled rodent burrows), and tree roots and/or a noticeable fall-off in the frequency of artifacts from one level to another.

Units were excavated manually with shovels, trowels, picks, small "dental" tools, and brushes. Fill from all units was screened through one-quarter inch mesh hardware cloth. All cultural material was stored in either paper bags or plastic zip-lock bags. (Aluminum foil packets were used to store radiometrically datable samples). All such containers were marked with the site number, unit number, level number and depth below surface, date of excavation, names of excavators, and any other pertinent information. Soil samples were collected at units where cultural materials smaller than the size of the screens were thought to occur. All fill from the excavated portion of features such as hearths was also retained. These samples were then processed by water flotation to recover small pieces of lithic, ceramic, and biotic material. Samples were also collected from some units and features which might yield sufficient material for pollen and/or opal phytolith analysis. All measurements were taken in the metric system.

When recognized features were encountered they were excavated separately from their surrounding soil or sediment matrix. No feature encountered during the Perry Lake Archaeological Project was excavated in its entirety. Only a portion of the feature was removed sufficient to determine its function and research potential. For example, a large basin hearth was partially exposed at the Senn's Hill site (14JF414). The fill from the excavated portion of this

feature was bagged in its entirety and subjected to water flotation under laboratory conditions. Flotation results in disaggregation of the soil matrix and separation of the residual materials into light and heavy fractions. The latter contains lithic and ceramic materials and the former includes microfloral and microfaunal remains.

Each unit was excavated by a team of at least two persons. Field notes, including level forms, feature forms, and profiles, were composed by each team. The Principal Investigator and Field Director kept a daily journal noting all personnel in the field, units begun or completed, significant finds or lack of same, condition of each site at the time of investigation, etc. Photographs, including color slide and black-and-white exposures, were taken of test units, features, and the progress of all phases of the fieldwork, and a photo-log was maintained.

The size of the field crew varied from day to day, ranging from a high of eleven persons to a low of six. However, the average crew consisted of the Principal Investigator, Field Director, and six excavators. Fieldwork commenced on July 25 and test excavations were completed on October 2, 1988. Backhoe work was conducted on October 13-14, and coring of selected sites with a Giddings mobile earth drill was done on December 1 and 3. These last investigations were undertaken by Dr. William Johnson, Project Geomorphologist, and the Principal Investigator.

Laboratory Analysis

All recovered materials were transported to the University of Kansas, Museum of Anthropology to be washed, sorted, cataloged, and analyzed. Each artifact was assigned a unique catalog number and, if possible, the number was written on the artifact. In all cases, artifacts were placed in vials or zip-lock plastic bags together with a card containing the catalog number (which incorporates the site number), unit and level provenience, type of artifact, and other pertinent information. The same information is also recorded in a set of record books designated for the Perry Lake Archaeological Project. These materials will be permanently curated at the University of Kansas, Museum of Anthropology, which also houses other professionally recovered collections from sites in the project area. It is the policy of the Museum of Anthropology to enter all of its collections into a computer-based data retrieval system. It is anticipated that the material recovered by Kaw Valley Engineering will also undergo this process.

Following the cataloging process, recovered materials were subjected to assemblage analyses. The collection was divided into the following categories for this process: lithics, ceramics, floral remains, faunal remains, and

historic materials. Historic artifacts comprise a very small percentage of the assemblages from 17 of the investigated sites. Only the historic component at the Senn's Hill site was to be evaluated for its National Register potential and the historic assemblage from that site is described in this report by Dr. William Lees, Kansas State Historical Society (see chapter 6). Small numbers of historic debris were recovered at other sites and a descriptive tabulation of this material is provided in Appendix 1.

Details on the analysis procedures for each of the prehistoric lithic, ceramic, and biological assemblages are provided in the sections devoted to each in this report. However, some general statements about the treatment of these assemblages can be provided here.

Lithic artifacts include all chipped-stone and groundstone items including formal and informal tools, cores, and debitage. Formal tools are those which resulted when a raw material blank, such as a flake, was modified to a finished shape that reflected some preconceived template on the part of the manufacturer. Examples are projectile points, scrapers, drills, knives, axes, gravers, and celts. Informal tools are those which result when the blank was not extensively modified prior to use. Rather, the only recognizable modification to the blank is attributable to its use in some task, such as scraping wood or hide. Examples of informal tools are notches, denticulates, and utilized flakes or chips. More detailed definitions of lithic artifact types are provided in chapter 7.

Ceramic artifacts often provide the most reliable means of identifying the cultural affiliation of the site with which they were associated. Since clay is a plastic medium, shaping it can result in an endless variety of forms. These forms, however, are dictated by cultural norms, including concepts of aesthetics and what constitutes a useful object (e.g., a pottery vessel used for cooking or storage). The combination of a plastic medium and aspects of form and style make ceramic materials ideal temporal indicators. The emphasis in the analysis of the ceramic assemblage from the tested sites in the Perry Lake area is on their utility for identifying the time of site occupation and the cultural affiliation of the site's occupants. Those attributes deemed most characteristic of certain culture complexes are defined and identified in chapter 8.

Biological remains from archaeological sites are valuable to the degree that they provide information on the environment of a site, the subsistence practices of its inhabitants, the season of their occupation, or the physiology of the inhabitants themselves. Human remains may provide information about the physical make-up of past populations. However, no burials or any other evidence of

human remains were encountered during this project. Floral and faunal remains, however, were found in small quantities at a few of the tested sites. These assemblages from the Perry Lake project are explored in chapter 9. Details concerning the methods of analysis for each category, including floral, opal phytolith, and faunal remains, will be found in the appropriate section of that chapter.

One other form of specialized analysis was applied during the Perry Lake Archaeological Project. This is radiocarbon dating, a form of absolute dating that provides the best means of determining the time of occupation of a site. Beta Analytic of Coral Gables, Florida was employed for radiocarbon dating. This institution provided a total of six dates on samples recovered from four sites (14JF409, 14JF410, 14JF414, and 14JF482). All dates have been calibrated using recent high-precision calibration curves developed by Stuiver and Becker (1986) and Pearson and others (1986) that are based on correlated dendrochronologic data from the US Pacific Northwest and Britain. Calibration was by means of a computer program based on this curve (Stuiver and Reimer 1987). All radiocarbon laboratory dates, averages, and calibrations from the Perry Lake Project area are provided in Appendix 2. Interpretations of these dates are found in the appropriate site descriptions in chapter 6 and in the discussion of site significance in chapter 10.

Geomorphic investigations were conducted by Dr. William C. Johnson, Department of Geography at the University of Kansas. Johnson inspected each test unit profile and collected soils geomorphic data. He also inspected all backhoe trenches for similar information and, when possible, examined stream bank exposures for buried soils. He retracted and examined soil cores from sites 14JF417, the Quixote site (14JF420), the Reichart site (14JF448/449), and 14JF484. The details of his methods of investigation and their results are provided in chapter 3 and in the geomorphic setting section that accompanies the description of each site in chapter 6.

Chapter 6

SITE DESCRIPTIONS

Michael Fosha, William C. Johnson and Brad Logan
(with a contribution by William B. Lees)

Introduction

This chapter describes the following aspects of each site: previous research, the geomorphic setting, investigations conducted during the 1988 field season, cultural material recovered, site interpretations, and recommendations regarding National Register potential. Results of data analyses and syntheses are presented in chapters 7-9; site evaluations and recommendations of significance and research goals are summarized in chapter 10. Site designations follow the Smithsonian trinomial system. Catalog numbers are provided for illustrated artifacts recovered as a result of our field work. These contain four-part designations of which the first two parts are the county and site number, the third (88) part is the year in which the artifact was recovered, and the fourth part is a sequential number for artifacts from that particular site.

A general map of the project area (Fig. 1.1) shows the location of each investigated site. This chapter includes specific site-topographic maps. Elevations on these maps are in meters above or below datum, which has an assumed elevation of 100 m. Contour intervals are either 50 cm or one meter. Specific deviations from general methods of site investigation (chapter 5) are noted under the heading "1988 Investigations" herein. Where a number of surface artifacts were collected, these are identified in a table that refers to the designation "Artifacts" on the site maps that accompany each site description. Tables show the type of cultural material recovered by unit, level and depth below surface in centimeters. These tables also show <u>all</u> levels excavated in each unit, regardless of artifact content.

14JF38

Name: Unnamed **Recorded:** KU, 1965
Cultural Affiliation: Pomona, Woodland
Topographic Setting: T-1 Terrace **Elevation:** 273m msl
Parent Material: Alluvium **Slope:** 3%
Drainage: Intermittent tributary of Little Slough Creek
Site Size: 8400 m^2 **Land Use:** Recreational
Surface Visibility: 25-100% **Ground Cover:** Grass/Beach
KVE Investigation: August 24-26, 1988

Previous Research

This site was initially recorded in 1965 by the University of Kansas, which located a scatter of prehistoric

ceramics, debitage, and burned stone and assigned it a Central Plains phase or Woodland affiliation (KUMA site survey form). A subsequent surface collection conducted by the U.S. Army Corps of Engineers 1980 Ranger Seminar located two point fragments and manufacturing debris (Parisi 1987:80).

The most recent investigations, conducted in 1985 by Environmental Systems Analysis, included a survey and four shovel tests. These investigations revealed a light scatter of prehistoric artifacts and recovered two flake scrapers, five edge modified flakes, debitage, and two badly eroded ceramic sherds suggested to be Woodland ware (Parisi 1987:80-82). Prehistoric artifacts were also recovered from the upper 30 cm of an apparently intact A horizon in the southwestern portion of the site. Consequently, testing was recommended to determine its National Register eligibility (Parisi 1987:85).

Geomorphic Setting

The unnamed site of 14JF38 is located on an alluvial terrace of Little Slough Creek at an elevation of approximately 273 m msl. Soil at the site is mapped as the Martin silty clay loam (Mc) in the Jefferson County soil survey (Dickey et al. 1977). Martin series soils generally consist of deep, gently sloping to moderately sloping soils on uplands and valley side slopes, and are formed in material weathered from moderately fine to fine grained shales. However, given the elevation and topographic situation of the site, it is probably on a remnant of a T-2 terrace of Little Slough Creek. The texture, color, and oxidized nature of the B horizon and terrace situation indicate the soil is developed in a late-Pleistocene loess deposited on an alluvial terrace. The soil type most closely approximates the Gymer silt loam - a fine, montmorillonitic, mesic Typic Argiudoll.

There is evidence of moderate soil erosion and localized intense soil disturbance. This can easily be explained by the early historical settlement and recent historical use as a recreational area for the lake. Most recent and extensive soil erosion has occurred due to cultivation of the surface. The Ap horizon directly overlies the Bt horizon. Table 6.1 provides a detailed description of the soil profile, as exposed, in Test Unit 3. A silt loam Ap horizon gives way abruptly to a well developed silty clay Bt horizon. A BA horizon probably existed originally but was transformed by plowing and subsequently eroded.

Soil stratigraphy and land-use history indicate significant loss of the prehistoric site materials has already occurred. Further, the age (development) of the soil makes it very unlikely that any prehistoric cultural

materials would be found buried at depth here due to alluvial or colluvial deposition.

Table 6.1. Description of Soil Profile in Test Unit 3 at 14JF38.

Depth (cm)	Soil Horizon	Description
0-15	Ap	Very dark grayish brown (10YR 3/2.5) silt loam; weak fine granular structure; friable; medium acid; abrupt smooth boundary.
15-20+	Bt	Dark brown (7.5YR 3.5/4) silty clay loam; weak to moderate subangular blocky structure; firm; thin, discontinuous clay films; medium acid.

1988 Investigations

The site was surveyed on August 24 and artifacts and artifact concentrations were pin-flagged. At that time the site area was in shortly cropped grasses with fair visibility (25%) and eroded shoreline with excellent visibility (100%). The areal extent of the site was determined to be about 8400 m^2, measuring 78 m north-south and 108 m east-west. A thin scatter of artifacts, recovered along the wave cut scarp of an eroded terrace, included one body sherd (Artifact 1), one historic pin (Artifact 2), and one biface fragment (Artifact 3, Fig. 6.1). A datum was established near the north-central portion of the site and six test units were placed in areas of artifact concentrations and areas not directly impacted by shore line erosion (Fig. 6.1).

Cultural material recovered from all test units was limited to the upper 10 or 20 cm and consisted of intermixed prehistoric and historic artifacts. No artifacts were located in the shallowly buried Bt horizon, exposed along the perimeter by wave action. The lack of stratigraphic integrity and the shallow nature of the artifact bearing zone indicate that severe erosion and surface disturbance have greatly impacted the site.

Assemblage

The total artifact assemblage from 14JF38 consists of 50 prehistoric pottery sherds, 143 pieces of debitage, four formal tools, and 46 historic artifacts attesting to the recent Euroamerican activity (Table 6.2; Appendix 1). The projectile points are both small, triangular in shape and lack any base. The ceramic sample consists of very small sherds (less than 2 cm^2), the majority of which are under one cm in length and exhibit highly eroded surfaces. Identification of cultural affiliation could not be determined on the basis of the ceramic assemblage (see chapter 8).

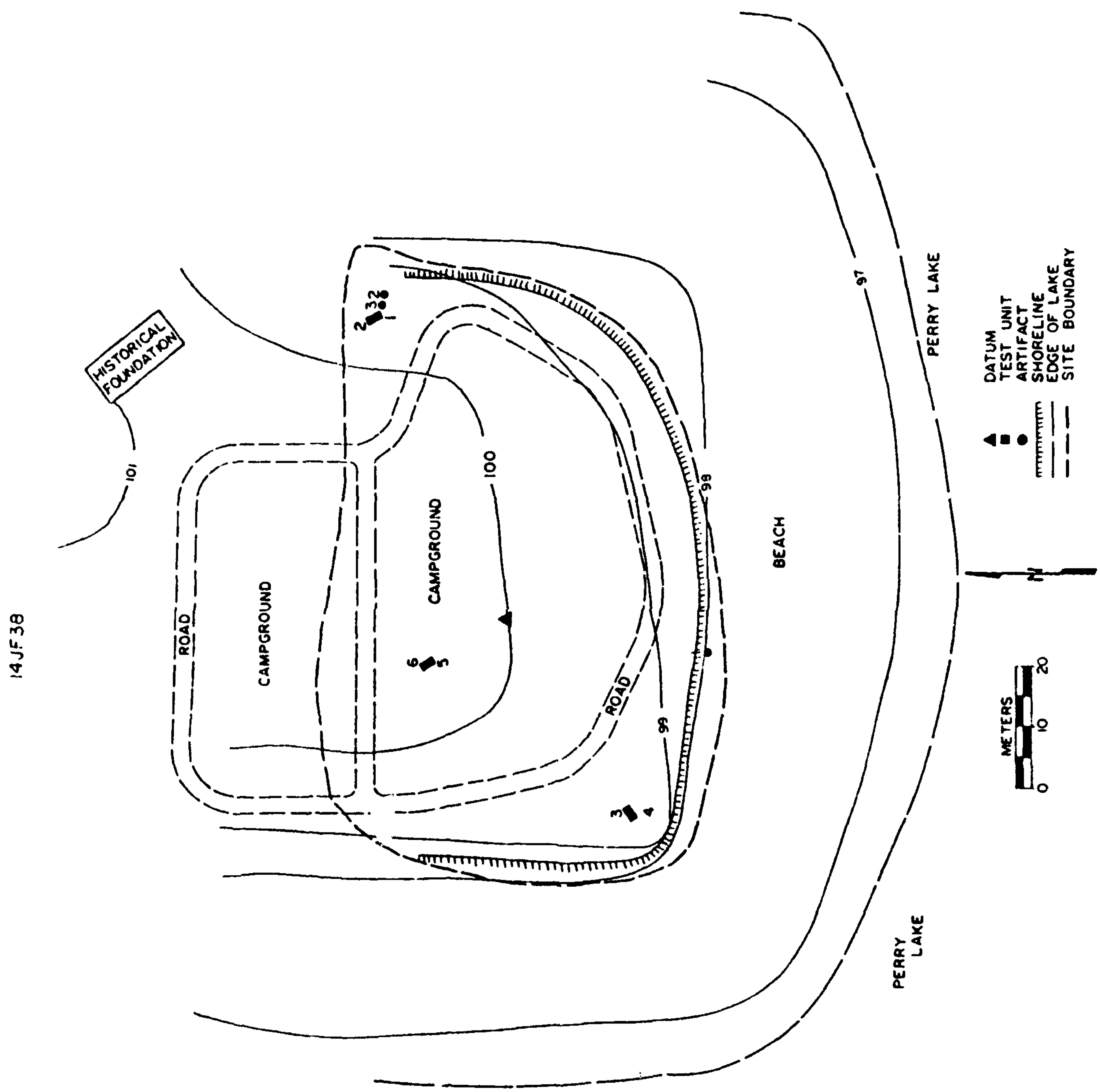


Figure 6.1. Map of 14JF38 showing location of surface finds and test units.

Table 6.2 Cultural Material Recovered from 14JF38.

Test Unit Level (cm)	Sur- face	xu1 1 0-10	xu1 1 10-20	xu2 1 0-10	xu2 2 10-20	xu3 1 0-10
Body Sherds	2	--	--	2	1	10
Potlids	-	--	--	--	--	2
Shatter	-	--	1	5	--	15
Flakes	-	--	4	10	4	7
Ret/Ut.Flake	-	--	--	--	--	1
Proj. Pts.	-	--	--	--	--	1
Biface Frag.	1	--	--	--	--	--

Table 6.2 (cont.)

Test Unit Level (cm)	xu3 2 10-20	xu4 1 0-10	xu5 1 0-10	xu5 2 10-20	xu5 3 20-30	xu6 1 0-20
Body Sherds	3	15	5	3	--	9
Potlids	--	6	--	--	--	--
Shatter	5	12	--	1	--	4
Flakes	6	14	10	13	--	21
Tested Matl.	--	--	1	--	--	--
Ret./Ut.Flake	--	1	--	--	--	1
Proj. Pts.	--	1	--	--	--	--
Biface Frag.	--	--	--	--	--	1

Interpretations

This site is apparently restricted to the shallow Ap soil horizon and has suffered destruction through wave action as well as Euroamerican occupation and recent pedestrian activity by campers. The ceramics are indicative of a Plains Village occupation. The wide scatter of dispersed artifacts suggests a cyclic or seasonal occupation by a small group of people or a short-term occupation by a larger group. Activities inferred from the artifact assemblage include game procurement, processing, cooking and chipped stone tool manufacture and maintenance.

Recommendations

The cultural deposits at 14JF38 are shallow and have been largely deflated due to wave action of Perry Lake and Euroamerican activities which apparently included agriculture. Artifact drop-off from the Ap to the Bt horizon was dramatic, suggesting the site has little depth. The

intermixing of prehistoric and historic artifacts at all levels indicates that all depositional integrity has been lost. Given this and the low frequency of cultural material, the site does not contain sufficient significance or research potential to warrant National Register consideration.

14JF103

Name: Unnamed
Recorded: ESA 1985
Cultural Affiliation: Unknown
Topographic Setting: Upland Ridge
Elevation: 279m msl
Parent Material: Glacial till
Drainage: Cedar Creek
Slope: 3-8%
Site Size: 8800 m^2
Land Use: Agriculture
Surface Visibility: 50-100%
Ground Cover: Milo
KVE Investigation: July 25-26, 1988

Previous Research

This site was recorded and surveyed by Environmental Systems Analysis in 1985, at which time five shovel tests were made (Parisi 1987:95). A 100% sample of cultural material collected from the surface includes two biface fragments, two modified pieces of debitage, lithic manufacturing debris, and quartzite cobbles. Shovel testing indicated a partially intact A horizon in the central portion of the site which might contain subsurface artifacts or features. On the basis of this finding, the site was recommended for testing in that area to determine its cultural affiliation and National Register eligibility (Parisi 1987:96).

Geomorphic Setting

The unnamed site of 14JF103 is located on a relatively narrow ridge top along the south valley wall of lower Cedar Creek at an elevation of about 279 m msl. Soil at the site is mapped as the Shelby-Pawnee complex (Sc) in the Jefferson County soil survey (Dickey et al. 1977). These soils have usually developed in glacial till and glaciofluvial deposits. Although the Shelby soil type dominates the complex, the soil exposed in test units at the site indicates it is likely the Pawnee clay loam - a fine, montmorillonite, mesic Aquic Argiudoll.

Soil erosion at the site has been moderate to severe. Cultivation has exposed the soil to erosion and removed the original A horizon over most of the site. The remaining A horizon material has been disturbed by plowing and by pedoturbation as the B horizon has expanded and contracted through repeated wetting and drying. The Ap horizon directly overlies the Bt horizon. Table 6.3 provides a detailed description of the soil profile, as exposed, in Test Unit 2. A fine sandy clay loam Ap horizon sits atop a well developed

clay loam Bt horizon. An AB horizon may have existed in the profile at the site but has been destroyed through cultivation and erosion.

Of all sites examined, this site is second only to the uppermost portion of 14JF447 in terms of degree of erosion. The erosion and great antiquity of the site explain the occurrence of small amounts of cultural material, only within the Ap horizon.

Table 6.3. Description of Soil Profile in Test Unit 2 at 14JF103.

Depth (cm)	Soil Horizon	Description
0-16 sandy	Ap	Very dark grayish brown (10YR 3/2.5) fine clay loam and few pebbles; moderate very fine granular structure; friable; slightly acid; clean abrupt boundary.
16-33+	Bt	Dark brown (10YR 4/5) clay to clay loam; moderate medium subangular blocky structure; very firm; few clay films on some peds; medium acid; large desiccation cracks.

1988 Investigations

This site was investigated on July 25 and 26. It was surveyed and artifact concentrations and site boundaries were pin-flagged. The area of the site covered by a light lithic scatter was 8800 m^2 (80 m north-south and 110 m east-west). The site is located upon the eroded surface of an upland ridge, somewhat oval in shape and truncated on the south by an adjacent highway. No formal tools or diagnostic artifacts were found upon the surface, which contained maturing milo with almost 100 percent visibility between the rows.

A datum was established along the southern boundary of the site in a row of trees bordering the highway easement. Eight test units were placed in areas to maximize site coverage and to test artifact concentrations (Fig. 6.2). Artifacts, except those recovered from desiccation cracks, were limited to the thin upper A horizon. The artifact count was small, consisting of manufacturing debris. Also encountered were large amounts of residual parent material and glacial till which covered the site. The lack of cultural material beneath the A horizon (0-5 cm in some areas; absent in all areas except for the central portion of the ridge) indicates the shallow nature and erosional history of the site.

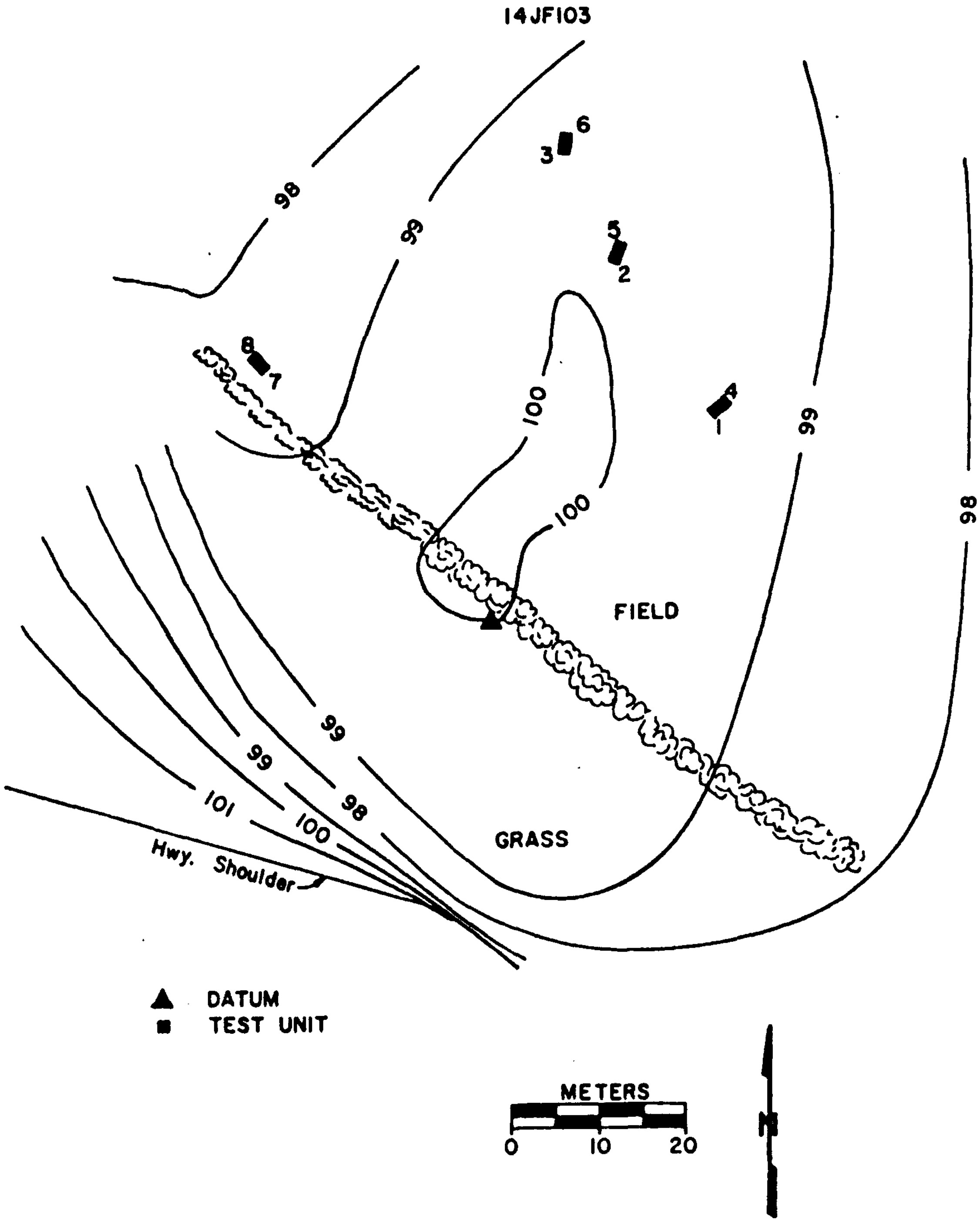


Figure 6.2. Map of 14JF103 showing location of test units.

Assemblage

Two retouched flakes and 51 pieces of debitage compose the artifact assemblage from 14JF103 (Table 6.4).

Interpretations

Due to the limited assemblage and the likelihood of extensive surface erosion, interpretation of this site is not possible. Its upland location is suggestive of a hunting camp.

Table 6.4 Cultural Material Recovered from 14JF103.

Test Unit		xu1	xu2	xu2	xu2	xu3
Level	Sur-	1	1	2	3	1
(cm)	face	0-20	0-20	20-30	30-36	0-20
Potlids	-	--	1	--	--	--
Shatter	1	1	2	--	--	--
Flakes	-	6	10	1	1	4
Tested Matl.	-	1	1	--	--	--
Ret./Ut. Flake	-	1	--	--	--	--

Table 6.4 (cont.)

Test Unit	xu4	xu5	xu6	xu7	xu7	xu8
Level	1	1	1	1	2	1
(cm)	0-20	0-16	0-5	0-10	10-20	0-8
Potlids	--	--	1	--	--	--
Shatter	1	1	2	--	--	--
Flakes	--	7	7	--	--	1
Tested Matl.	--	--	3	--	--	--
Ret./Ut. Flakes	1	--	--	--	--	--

Recommendations

The bluff top setting of this site has been subject to agricultural practices and severe erosion which appear to have destroyed its integrity. Moreover, the scarcity of artifacts other than debitage noted during our present investigation as well as the original survey suggests that the site has little research value. 14JF103 lacks sufficient content and integrity and is not considered eligible for nomination to the National Register.

14JF105

Name: Unnamed **Recorded:** ESA 1985
Cultural Affiliation: Late Archaic (Nebo Hill phase); Plains Village; Historic
Topographic Setting: Upland remnant **Elevation:** 276m msl
Parent Material: Glaciofluvial deposit
Drainage: Delaware River **Slope:** 3-8%
Ground Cover: Soybeans; Access Road **Land Use:** Agriculture
Surface Visibility: 50-100%
KVE Investigation: August 1-3, 1988

Previous Investigations

The site was initially recorded in 1985 by Environmental Systems Analysis. Investigations consisted of a 100 percent surface collection and excavation of five shovel tests. Data recovered included 62 prehistoric artifacts and one historic glass bottle of post-Prohibition age. It was suggested that the site may have been occupied by the Delaware Indians during the time the project area was included in their reservation (Parisi 1987:97). This inference was based on the presence of a limestone well at the site, and the fact that the site area had been designated an "Indian Village" on the 1856 GLO plat map.

Prehistoric artifacts found consisted of one projectile point, one biface fragment, three modified flakes, manufacturing debris, unworked stone and shell. Based upon the single unnotched projectile point, a Plains Village cultural affiliation was designated for the site. It was suggested that the site be tested to determine its National Register eligibility (Parisi 1987:100).

Geomorphic Setting

Site 14JF105, at an elevation of about 276 m msl, is located on an unusually preserved remnant of glacial material, perhaps mantling an old alluvial deposit or bedrock, between the Delaware River and Walnut Creek, i.e., in their confluence area. Specifically, the site is bound on the west by the Delaware River, the south and east by T-1 terrace of the river, and the north by organic-rich channel fill of the Delaware River or Walnut Creek.

The soil stratigraphy at the site proper was investigated by an examination of Test Unit 4. Further, the site and adjacent areas were investigated via five backhoe trenches arranged in a topographic sequence from the southwest fringe of the site north-westward down into the adjacent channel fill. The rationale behind the trenching was one of discerning 1) the nature of the subsurface material at the site, 2) the type of contact between the two

earth materials, and 3) the potential for post-occupational loss of site due to lateral erosion by the river channel.

Soil at the site is mapped as the Shelby-Pawnee complex (Sc) in the Jefferson County soil survey (Dickey et al. 1977). The soil, a fine-loamy, mixed, mesic, Typic Argiudoll, is typically situated on narrow ridge tops and valley side slopes and forms in glacial deposits, here glaciofluvial sediments. The soil was examined in both a test unit (no. 1) and the backhoe trenches. Table 6.5 provides a description of the soil as exposed in the 25cm-deep test unit. Only the plow zone, i.e., the Ap horizon, was exposed, and it was subdivided on the basis of the disc and plow activity and plow activity alone.

The soil stratigraphy was examined in each of the five backhoe trenches. Because of spacing and soil differences, the descriptions for trenches 1, 3, 4, and 5 are presented here. Trench 1 exhibited a soil very similar to the type profile of the Shelby-Pawnee complex. The profile is comprised of Ap, BA, and Bt horizons (Table 6.6.)

Trench 3 was excavated in the lower portion of the scarp, since Trench 2, in an intermediate location, produced a soil stratigraphy similar to Trench 1. The soil profile in Trench 3 is still far more similar to that of Trench 1 than Trenches 4 and 5 at still lower elevations. Table 6.7 provides a description of the soil in Trench 3.

Trenches 4 and 5 produced profiles very different from the previous three. The soil mapped by Dickey and others (1977) in this lower lying area is the Reading silt loam (Re), a deep, nearly level soil forming on second bottoms in silty alluvium. It appears, however, as though the soil is more closely related to the Wabash silty clay loam (Wh), a fine, montmorillonitic, mesic Vertic Haplaquoll, except for the lack of strong gleying within the solum. The latter is a deep, nearly level bottomland soil, formed in clayey alluvium within backwater swamps or swale areas. Tables 6.8 and 6.9 portray the profile data of Trenches 4 and 5.

Site 14JF105 is uniquely located: on high ground at the confluence of the Delaware River, Walnut Creek, and Cedar Creek. The high ground is a remnant of glaciofluvial sediments overlying either bedrock or older alluvium. The well-defined scarp on the north side of the site indicates a former channel bank location, as does the organic-rich Wabash silty clay loam soil exposed within trenches 4 and 5. Consequently, the aboriginals, at least for a certain period of time, enjoyed both a high-ground perspective and an immediately adjacent water supply.

Table 6.5. Description of Soil Profile in Test Unit 1 at 14JF105.

Depth (cm)	Soil Horizon	Description
0-10	Ap1	Very dark grayish brown (10YR 3/2) light clay loam; poor coarse granular structure; friable, slightly acid; much crop residue; abrupt clear boundary.
10-25+	Ap2	Very dark grayish brown (10YR 3/2) clay loam; moderate fine granular structure; friable; slightly acid; gradual smooth boundary.

Table 6.6. Description of Soil Profile in Trench 1 at 14JF105.

Depth (cm)	Soil Horizon	Description
0-30	Ap	Very dark grayish brown (10YR 3/2) fine sandy loam; moderate fine granular structure; friable; slightly acid; gradual smooth boundary.
30-50	BA	Dark brown (10YR 3/3) sandy clay loam and a few pebbles; moderate medium granular structure; friable; slightly acid; gradual smooth boundary.
50-71	Bt1	Dark yellowish brown (10YR 4/4) sandy loam and a few pebbles; moderate medium subangular blocky structure; firm; films on some peds; medium acid; gradual smooth boundary.
71-111	Bt2	Dark yellowish brown (10YR 4/6) clay loam; moderate medium subangular blocky structure; firm; films on many peds; few fine black concretions; medium acid; clear smooth boundary.
111-137+	2Bt3	Yellowish brown (10YR 5/5) sandy clay loam; weak medium and coarse subangular blocky structure; firm; some films on peds; medium acid.

Table 6.7. Description of Soil Profile in Trench 3 at 14JF105.

Depth (cm)	Soil Horizon	Description
0-20	Ap	Very dark gray (10YR 3/1) fine sandy loam; moderate fine granular structure; friable; slightly acid; clear smooth boundary.
20-36	AB1	Very dark grayish brown (10YR 3/2) fine sandy loam; moderate medium granular structure; friable; slightly acid; gradual smooth boundary.
36-60	AB2	Black (10YR 2/1) fine sandy loam; moderate medium granular structure; friable; slightly acid; gradual smooth boundary.
60-72	BA	Dark yellowish brown (10YR 3/4) fine sandy loam; weak medium subangular blocky structure; firm; slightly acid; gradual smooth boundary.
72-86	Bt1	Dark yellowish brown (10YR 3/4) fine sandy loam; moderate medium subangular blocky structure; few films on some peds; firm; slightly acid; clear smooth boundary.
86-116+	2Bt2	Yellowish brown (10YR 5/5) silt loam; moderate medium subangular blocky structure; few films on peds; firm; slightly acid.

Table 6.8. Description of Soil Profile in Trench 4 at 14JF105.

Depth (cm)	Soil Horizon	Description
0-18	Ap	Very dark grayish brown (10YR 3/2) fine sandy clays; moderate medium granular structure; friable; slightly acid; clear smooth boundary.
18-60	2AB	Very dark gray (10YR 3/1) silty clay; moderate fine subangular blocky structure; firm; slightly acid; gradual smooth boundary.
60-83	2Bt1	Black (10YR 2/1) silty clay; moderate medium subangular blocky structure; firm; slightly acid; thin continuous films on peds; few fine ferromanganese concretions; gradual smooth boundary.
83-123+	2Bt2	Black (10YR 2/1) heavy silty clay; moderate medium subangular blocky structure; firm; thin continuous clay films on peds; few fine ferromanganese concretions; slightly acid.

Table 6.9. Description of Soil Profile in Trench 5 at 4JF105.

Depth (cm)	Soil Horizon	Description
0-27	Ap	Black (10YR 2/1) fine sandy clay; moderate medium granular structure; friable; slightly acid; clear smooth boundary.
27-54	A	Very dark gray (10YR 3/1) heavy silty clay; moderate medium granular structure; very firm; slightly acid; gradual smooth boundary.
54-72	Bt	Black (10YR 2/1) heavy clay; moderate medium subangular blocky structure; very firm; thin continuous films on peds; few fine ferromanganese concretions; medium acid; gradual smooth boundary.
72-142+	C	Black (10YR 2/1) heavy clay; massive; very firm; slightly acid; few fine ferromanganese concretions.

1988 Investigations

The site was investigated on August 1, 2, and 3. The site at that time contained soybeans along the northern portion of the site with good visibility between the rows (50-60%) and recently broken wheat stubble and an adjacent road to the south with 100 percent visibility. The site was located upon a high terrace, bordered on the north by a low floodplain, on the west by the Delaware River, and on the south by timber, tall grass and brush.

A survey entailed pin-flagging artifacts and site boundaries, which followed the crest of the terrace for a distance of 125 m east-west and 30 m north-south. The site was elongated and oval in shape covering an area of 3750 m^2, and contained a very light surface scatter. A datum was established, four test units were placed in areas of artifact concentrations and formal tools and cores were mapped (Table 6.10; Fig. 6.3).

Table 6.10 Surface Artifacts from 14JF105 shown in Figure 6.3.

Artifact 1	1 Nebo Hill point (Fig. 6.4a)
Artifact 2	1 Core
Artifact 3	1 Core
Artifact 4	1 Scraper (Fig. 6.4b)
Artifact 5	1 Core

Excavations revealed a small quantity of lithic material, daub and quartzite, with lesser quantities of limestone, ferrous oxide, and historic artifacts. Artifacts were limited to the upper 20 cm of all test units with the exception of Unit 4 in which three small pieces of debitage were recovered from the 20-40 cm levels, possibly repositioned by the numerous desiccation cracks noted in this unit. Consistent with the majority of upland or T-2 terrace sites, the artifacts were limited to the thin A or Ap soil horizon with little or no subsurface integrity.

Assemblage

The artifact assemblage from 14JF105 consists of 50 pieces of debitage and two tested pieces retrieved from excavations, three cores and two formal tools from the surface (Table 6.11). The tools recovered consist of one scraper (Fig. 6.4b) and the basal half of a Nebo Hill lanceolate biface (Figure 6.4a).

Interpretations

The artifact assemblage only provides tentative identification of the site's cultural affiliations. The

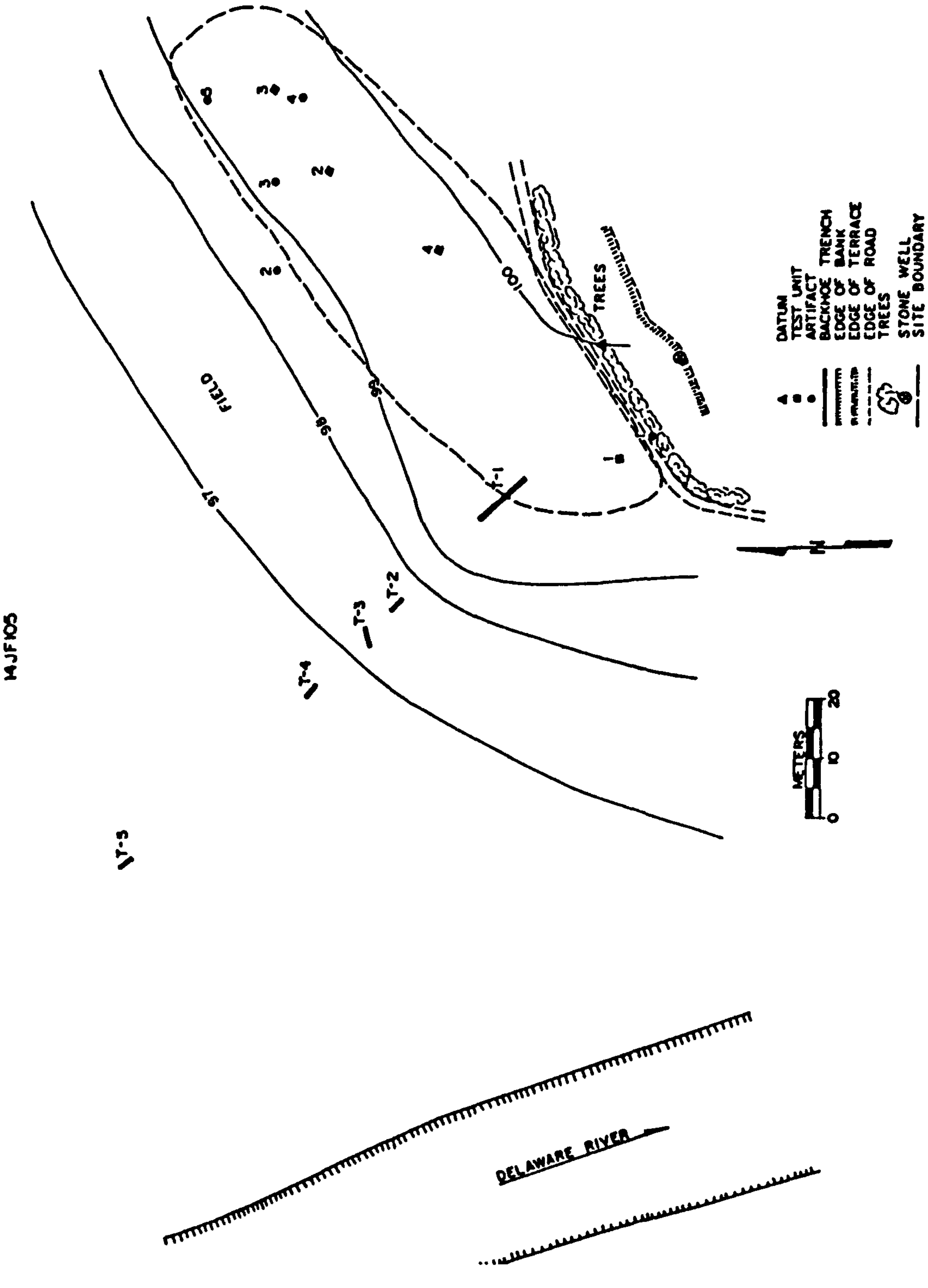


Figure 6.3. Map of 14JF105 showing location of surface finds, historic well, test units, and backhoe trenches.

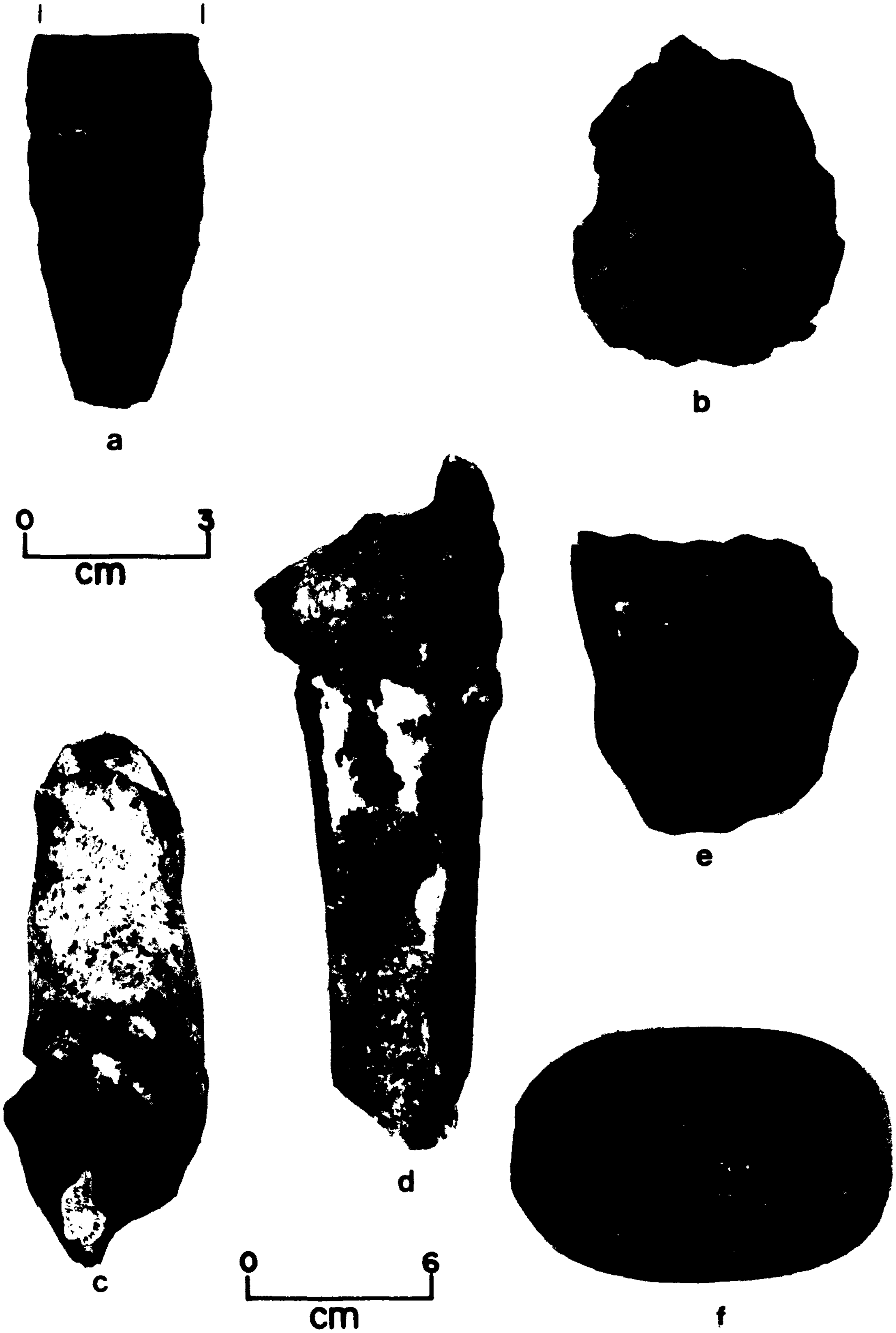


Figure 6.4. Selected artifacts from 14JF105 and 14JF410. a) Nebo Hill biface, JF105880025 b) scraper, JF105880028 c) right calcaneum, bison d) right proximal metatarsal with scapho-cuboid and grand cuniform, bison e) body sherd f) mano. Artifacts c-f are in the Reichart collection, Kansas State Historical Society. Artifacts c-d, f are to 6 cm scale.

Table 6.11 Cultural Material Recovered from 14JF105.

Test Unit	xu1	xu1	xu1	xu2	xu2	xu2
Level	1	2	3	1	2	3
(cm)	0-10	10-20	20-30	0-10	10-20	20-30
Shatter	4	3	--	--	--	--
Flakes	7	22	2	--	1	--
Core	--	--	--	--	--	--
Tested Matl.	--	1	1	--	--	--

Table 6.11 (cont.)

Test Unit	xu3	xu3	xu4	xu4	xu4	xu4
Level	1	2	1	2	3	4
(cm)	0-10	10-20	0-10	10-20	20-30	30-40
Shatter	--	1	--	1	--	--
Flakes	--	1	1	2	2	1

investigation by ESA recovered one small triangular projectile point. Based upon this artifact and the previously discussed well and map relating this area to the Delaware Indian Reservation, a "late prehistoric, protohistoric, or possibly early historic occupation" was suggested for this site (Parisi 1987:99). Present investigations could neither substantiate nor clarify this designation. The single Nebo Hill biface fragment indicates a Late Archaic component may also be present at the site. 14JF105 appears to have been occupied during the Late Archaic (Nebo Hill phase), Plains Village, and Historic periods. The single biface and scraper are indicative of hunting and either hide working or woodworking. The cores and debitage reflect tool manufacturing. The limestone well suggests a relatively permanent occupation during the Historic period though our investigations failed to yield additional evidence to support this interpretation.

Recommendations

Excavations reveal that the site has been deflated by erosion and agricultural activities. Its cultural deposits are both shallow and sparse. Consequently, this site is not considered eligible for the National Register. However, the limestone well located on the southern edge of the site may contain artifacts dating to the Historic period of occupation. It is recommended that the contents of the well be tested prior to any disturbance or destruction of the structure to determine if it contains significant deposits.

14JF409

Name: Cut-Bank Site **Recorded:** Reichart 1971
Cultural Affiliation: Early Archaic; Middle Archaic (Munkers Creek phase); Late Archaic/Plains Woodland?
Topographic Setting: T-1 Terrace **Elevation:** 279 m msl
Parent Material: Alluvium **Slope:** 2%
Drainage: Delaware River **Site Size:** at least 700 m^2
Ground Cover: Grass, brush, timber **Land Use:** Wildlife
Surface Visibility: 0% in brush; 100% along cut-bank
KVE Investigation: August 22-24, 1988

Previous Investigations

This site had not been investigated since its initial recording by Milton Reichart in 1971. At that time, it was described as occurring on both a hillslope and an alluvial terrace. Artifacts found at the site include two bifaces, five projectile points or fragments, one grooved ax, two greenstone grinding stones, and one hammerstone (Fig. 6.5). Burned limestone and glacially-derived quartzite pieces were also noted in the site area.

According to the site survey form, three bifacially shaped stone tools had also been recovered at the site by a Mr. Eisele in 1966. These included a straight stemmed dart point with marginal retouch, a side-notched dart point, and a broken biface. No debitage or pottery was noted on the surface of the site. A cut-bank inspection by Reichart revealed nine burned stones and a single piece of debitage at a depth of approximately 3.5 meters in the site area. During subsequent visits to the site, Reichart noted lithic artifacts protruding from the cut-bank. These occurred in two areas approximately 45 m apart, located to the north and south of a disconformity in the cut-bank. Artifacts located in the northern area were located at a depth of two meters and include a side-notched projectile point (Fig. 6.6b), the poll of a grooved axe (Fig. 6.6c), a Munkers Creek knife (Reichart 1988b; Fig. 6.6g) and a mano.

South of the disconformity, Reichart found two corner-notched dart points, a square-stemmed point, a side-notched point with a concave base similar in morphology to the Graham Cave notched type (Fig. 6.6a), two scrapers (Fig. 6.6d-e), and an _in situ_ barbed projectile point base (Fig. 6.6f). At a point in this area where Reichart noted several pieces of debitage eroding from the bank, he conducted a limited excavation. Material recovered from this test, which he called Area 861, includes several pieces of carbonate-encrusted animal bone, hematite, a few cores, more than 250 pieces of debitage, primarily of local alluvial cherts, three bifaces, and a reworked point of jasper (Figure 6.6h). Reichart (1988b) suggests this last artifact is comparable to either the Plainview or Meserve point types.

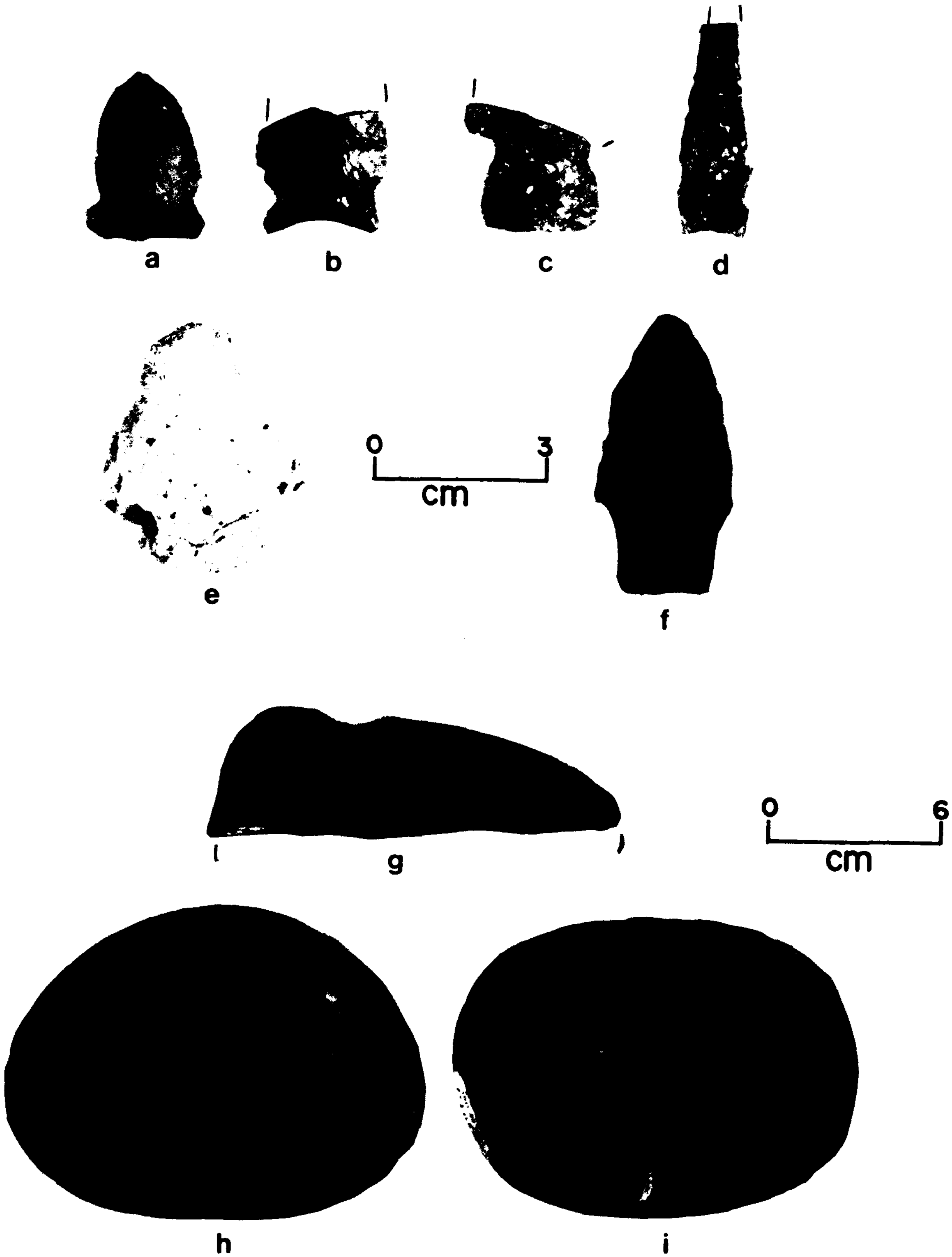


Figure 6.5. Selected artifacts from the surface component at14JF409 in the Reichart collection, Kansas State Historical Society. a-f) bifaces with a hafting element g) grooved axe h) pitted grinding stone i) mano. Artifacts g-i are to 6 cm scale.

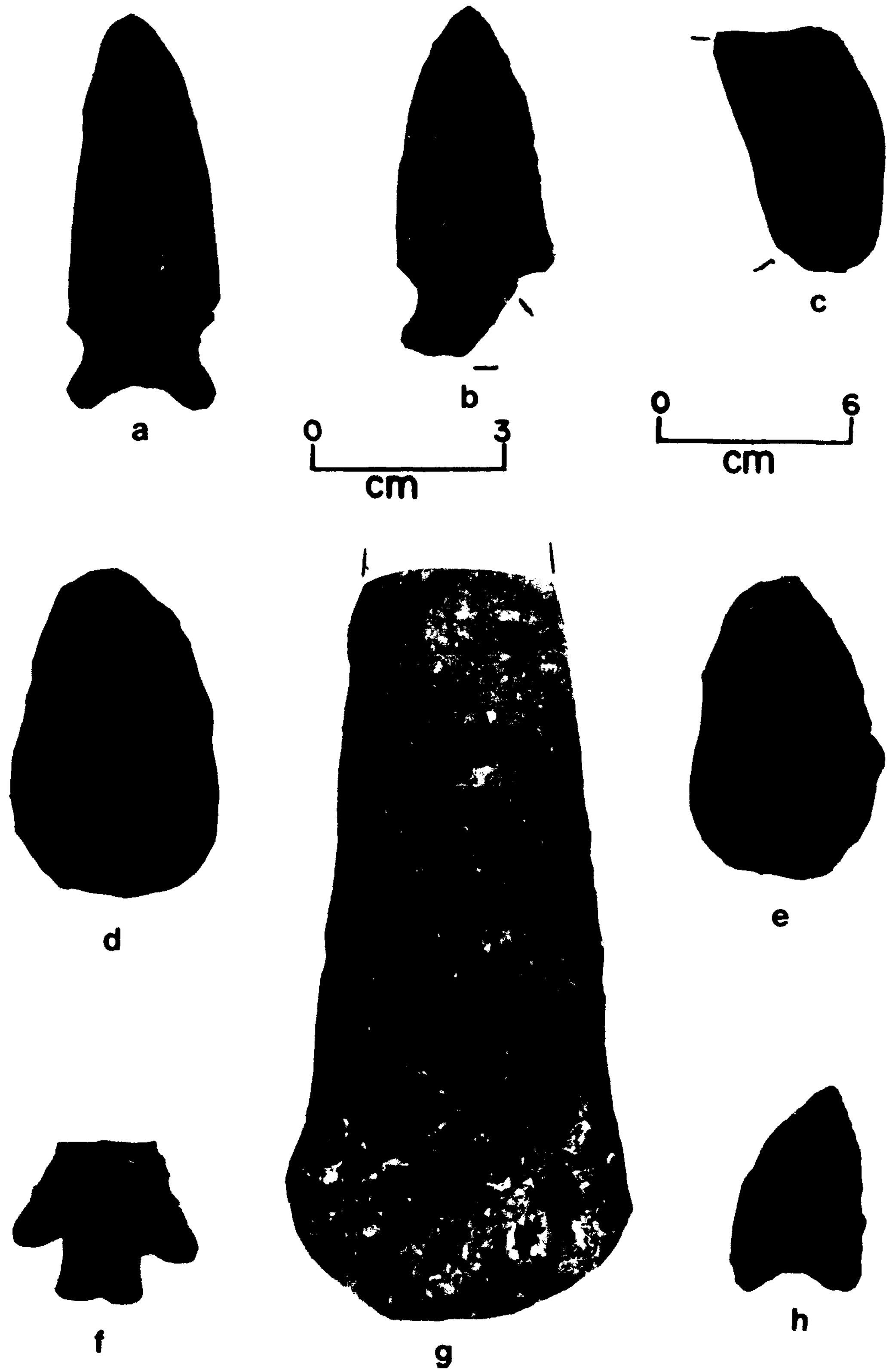


Figure 6.6. Selected artifacts from the buried components at 14JF409 in the Reichart collection, Kansas State Historical Society. a-b) side-notched bifaces c) poll of a three-quarter grooved axe d-e) scrapers f) "eared" point with serrate blade g) Munkers Creek knife h) reworked point with concave base. Artifact c is to 6 cm scale.

Geomorphic Setting

The aptly-named Cut-Bank site (14JF409) is located on an alluvial terrace of the Delaware River at an approximate elevation of 279 m msl. Soil at the site is mapped as the Kennebec silt loam (Kb) in the Jefferson County soil survey (Dickey et al. 1977). Kennebec series soils, fine-silty, mixed, mesic Cumulic Hapludolls, are deep and develop in silty alluvium on nearly level first bottoms. The site appears to be on and within a T-1 terrace and its fill that have persisted along the east side of the Delaware River valley. Only a 30-40 m width of the terrace and associated fill exist in the vicinity of the site.

An examination of the cut-bank exposure indicates a cut and fill sequence, probably resulting from cutting by the small, high-energy tributary, presently containing an earthen dam, that drains the upland to the northeast. As the Delaware River channel migrated vertically and/or horizontally, the small tributary apparently cut and filled through the terrace fill accordingly. The lighter color of the inset tributary fill attests to its adjacent upland source as well, i.e., the sediments were not transported downstream to the point by the Delaware River. The result is a very noticable disconformity in the alluvial fill. This is significant because of the presence of deeply buried cultural material within both fills.

In addition to the bank profile, test units, and shovel pits created, two backhoe trenches were excavated. Trench 1, cut to a depth of 4.05 m, encountered the horizon in which Feature 1 of Profile 2 occurred. The trench wall was sampled to represent both stratigraphy and soil horizonation. Results of the chemical and physical analyses conducted on the samples are presented in Table 6.12. Laminated overbank sediments are clearly noted in the Kennebec soil developing above a buried soil which is probably an equivalent of the Reading silt loam (Fig. 6.7). The former are very sandy at the surface (58%), and of high pH throughout, indicating the presence of carbonates yet to be leached. The laminated sediments were likely deposited during floods of the historical period. Samples from the Ab horizon are somewhat darker in color and richer in organic matter than others. A thin (15 cm) AB horizon exists, and the remainder of the soil is C horizon, with increasing levels of carbonate downward. The soil is the Kennebec, as noted above, because of the simple profile development, including the lack of a Bt horizon. The particle size data indicate the consistency of the sediment size carried by the stream system for the last 8000 or more years. Regardless of the relative amount of sand, silt, or clay in a given sample, the size fraction varies little, e.g., sands are typically fine to very fine, silts coarse and/or fine, and clays coarse and/or fine. Loess, glacial till, and to a lesser extent, weathered bedrock have produced the sedimentological signature.

Figure 6.7. Laminated silts from periodic flooding of upper component at 14JF409.

Trench 2, placed distal to the river channel, was situated in a zone of facies change, from alluvial to colluvial sediments, i.e., a toeslope position. Also, being approximately 1 m higher, it had no overbank sedimentation evident and indicated greater antiquity. Shallow probing suggested the soil merges with the soil buried adjacent to the channel, i.e., the Kennebec soil pinches out away from the channel. Table 6.13 presents the soil profile description. The soil series for this profile is somewhat elusive, but it may fall within the Vinland series.

The two radiocarbon ages of 8220 ± 350 yr B.P.: 6270 B.C. (Beta-29435) and 5710±100 yr B.P.: 3760 B.C. (Beta-29436) are consistent geomorphically. That is, the younger radiocarbon age was obtained from sediments inset into the alluvium producing the older age. Further, the 3 m-plus burial depth of the cultural deposits would indicate that the Archaic was a time of lower river channel elevation, relative to that of today. The post-Archaic aggradation evidenced at the site is consistent with the geomorphic record obtained for the Kansas River basin thus far (Johnson and Martin, 1987; Johnson and Logan, 1990).

Table 6.12. Chemical and Physical Sediment Data from Trench 1 at 14JF409.

Sample			Particle-size (%)			Color	LOI	pH
No	Depth (cm)	Soil Horizon	Sand	Silt	Clay	(Munsell-moist)	(%)	
1	5-10	A(?)	58(F)	31(C)	11(F)	10YR 3/2	2.36	7.57
2	25-30	C	12(F)	81(M/F)	7(F)	10YR 3/2	2.88	7.60
3	45-50	"	56(F)	30(C)	14(M)	10YR 3/2	1.81	7.66
3a	54-59	"	27(F/VF)	70(C)	3(C/F)	10YR 3/2	3.54	7.43
4	62-70	Ab	28(M/F)	65(C-F)	7(C/M)	10YR 2/2	4.20	6.79
5	80-85	"	12(F)	51(C)	37(F)	10YR 2/2	4.28	5.78
6	90-95	AB	19(F/VF)	56(C-F)	25(F)	10YR 2/2	4.61	5.39
7	100-110	C1	12(F)	47(C)	41(F)	2.5Y 3/2	3.83	5.53
8	110-115	"	13(F)	47(C)	40(F)	10YR 3/4	3.87	5.56
9	130-135	C2	20(F)	61(C-F)	25(F)	10YR 3/4	3.09	6.20
10	180-185	"	12(F/VF)	63(C-F)	25(F)	10YR 3/4	3.01	6.57
11	230-235	"	22(F/VF)	66(C)	12(C&F)	10YR 3/4	2.81	6.62
12	260-265	"	16(F/VF)	69(C-F)	15(F)	10YR 3/6	2.96	6.60
13	290-295	C3	18(F/VF)	72(C-F)	10(C&F)	10YR 3/6	2.63	6.60
14	310-315	"	7(F)	60(C)	33(F)	10YR 4/4	2.89	6.53
15	350-355*	"	26(F/VF)	66(C-F)	8(C)	10YR 4/4	2.91	6.83
16	400-405+	"	3(F/VF)	62(C)	35(F)	10YR 3/3	3.33	6.72

* approx. level of 8220 ± 350 yr B.P./6270 B.C. radiocarbon age (Beta-29435)

Table 6.13. Description of Soil Profile in Trench 2 at 14JF409.

Depth (cm)	Soil Horizon	Description
0-18	Ap	Very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; medium acid; abrupt smooth boundary.
18-26	A	Very dark gray (10 YR 3/1) silt loam; moderate fine granular structure; friable; slight acid; gradual smooth boundary.
26-36	BA	Dark yellowish brown (10YR 4/6) silty clay loam; moderate fine subangular blocky structure; friable; slightly acid; gradual smooth boundary.
36-58	Bt(?)	Dark yellowish brown (10YR 4/4) silty clay loam; fine and very fine subangular blocky structure; friable; slightly acid; clear smooth boundary.
58-82	C1	Dark yellowish brown (10YR 4/6) silty clay loam; massive; firm; slightly acid; gradual smooth boundary.
82-195+	C2	Yellowish brown (10YR 5/6) silty clay loam; massive; firm; slightly acid.

1988 Investigations

The site was investigated August 22, 23, and 24. Initial investigations included establishing two data, one on the cut-bank for the buried components and another in the brush covered area of the surface component, inspection of the cut-bank, and the excavation of three profiles in areas of charcoal concentrations and where cultural material had been noted in the past (Figs. 6.8, 6.9). Artifacts located on the surface of the cut-bank included one core, one flake and 15 bone fragments (Table 6.14). Excavation of Profile 1 (Fig. 6.9) revealed Feature 2 (Fig. 6.10), which consisted of hearth debris (burned limestone, sandstone, and a dense scatter of charcoal). Excavation of Profile 2 (Fig. 6.9) revealed Feature 1 (Fig. 6.11), a concentration of burned limestone, charcoal and associated lithic debris. A flotation sample collected from Feature 1 contained charcoal, bone, and lithic manufacturing debris (Table 6.15). Excavation of Profile 3, which was immediately south of Reichart's Area 861, yielded only a single flake and one core.

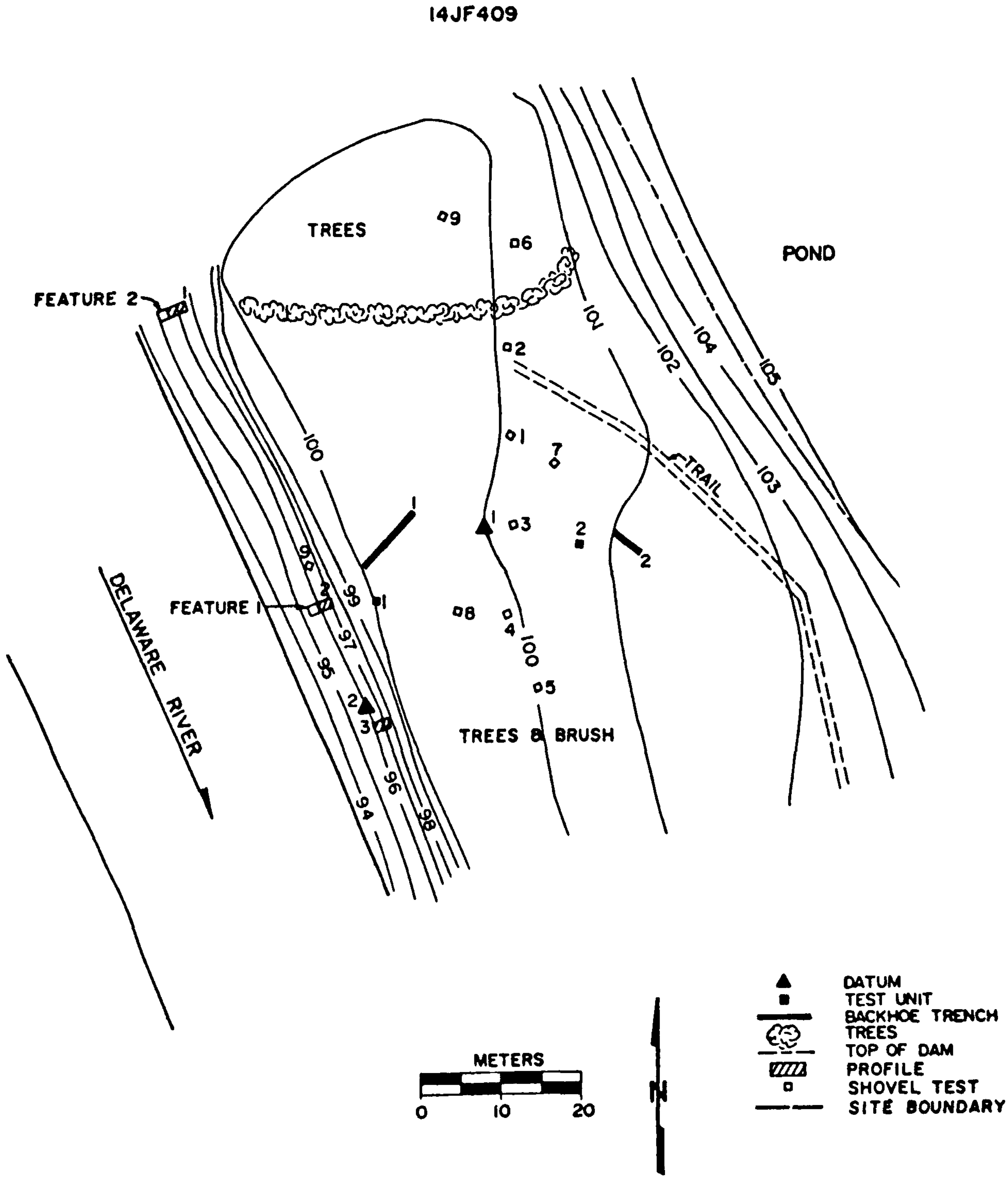


Figure 6.8. Map of 14JF409 showing location of shovel tests, test units, backhoe trench, profiles and features.

Figure 6.9. above) View of 14JF409 looking north; men mark the locations (l-r) of Profiles 1-3. Transit and datum are at Reichart's Area 861. below, left) Profile 1, Feature 2. below, right) Profile 2, Feature 1.

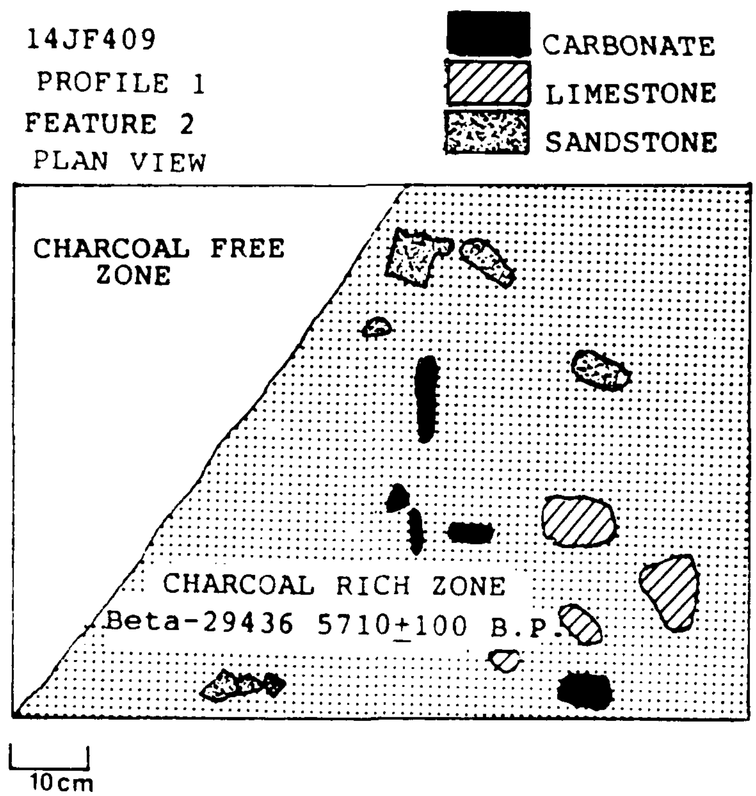


Figure 6.10. Photograph and drawing of Feature 2 at 14JF409.

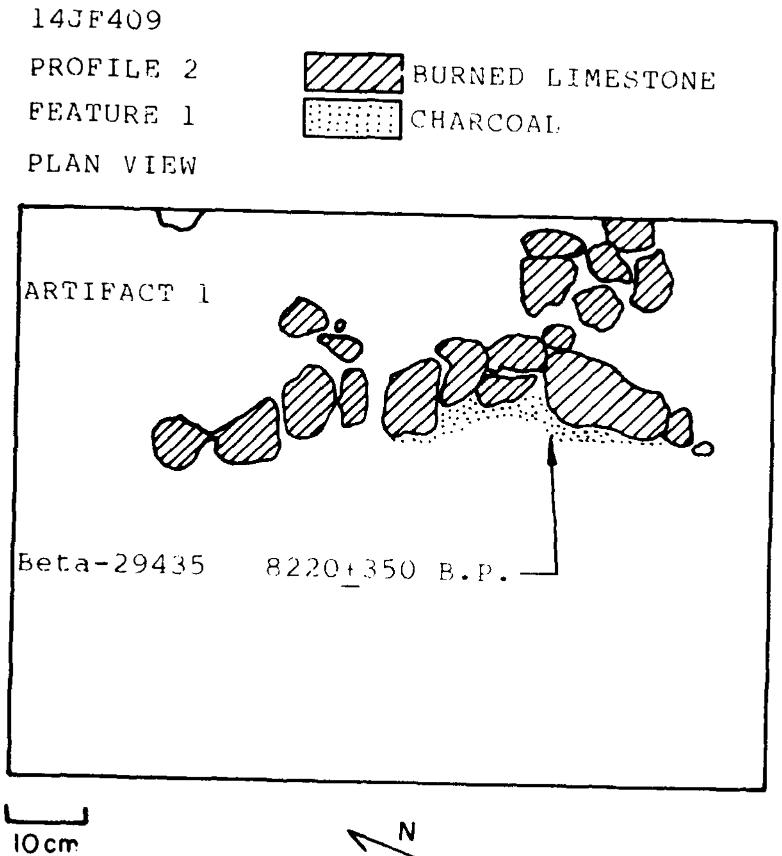


Figure 6.11. Photograph and drawing of Feature 1 at 14JF409.

Feature 1 appeared as the remnants of a stone lined hearth. Prior to excavation charcoal, burned earth and burned limestone were noted eroding from the cut bank at a depth of approximately 4 m. Excavation revealed a cluster of burned limestone and charcoal 10 cm thick between 350 and 360 cm below the ground surface of the stream bank. A charcoal sample from the feature returned a date of 8220±350 BP: 6270 B.C. (Beta 29435).

Feature 2 consisted of a dense concentration of charcoal with a small amount of limestone and sandstone. This feature was located approximately 15 m north of Feature 1 and 40 cm lower in elevation. A charcoal sample from this feature yielded a date of 5710±100 BP: 3760 B.C. (Beta 29436).

The limits of the surface component of the site were indicated to us by Milton Reichart, who assisted the excavation team during its investigation of 14JF409. According to Reichart's recollection, this component extended over an estimated 2600m^2. At the time of our investigation this area was covered with dense grass, brush, and light timber which restricted visibility from 0-10% and necessitated the excavation of shovel tests. A series of nine such tests was excavated along a general north-south transect through the reported center of the surface component (Fig. 6.8). These were not effective in locating cultural material but did indicate a relict plow zone buried by laminated alluvial silts in the lower portion of the site and a partially intact A horizon on the slope. A test unit was placed in each of these areas, where Reichart had found artifacts during his surveys. Two backhoe trenches were excavated to determine the extent of the buried components noted in the cut-bank exposure (Figure 6.8).

Excavations revealed a limited amount of lithic material in Unit 1 and 2 and no cultural material in either of the backhoe trenches. Cultural material obtained in Unit 1 was confined to the plowzone (10-30 cm below ground surface), which was buried beneath 10 cm of recent over-bank deposits. None of the recovered artifacts is culturally or temporally diagnostic.

Assemblage

A small artifact assemblage was recovered from 14JF409. This included 12 pieces of debitage, four cores, one biface fragment and bone (Table 6.14). Other material obtained included quartzite and sandstone from the surface excavations and from the cut-bank profiles.

Table 6.14 Cultural Material Recovered from 14JF409.

Test Unit Level (cm)	xu1 1 0-10	xu1 2 10-20	xu1 3 20-30	xu2 1 0-10	xu2 2 10-20	xu2 3 20-30
Shatter	--	--	1	--	--	--
Flakes	--	6	1	--	--	--
Core	--	1	2	--	--	--
Tested Matl.	--	--	--	1	--	--
Biface Frag.	--	--	1	--	--	--

Table 6.14 (cont.)

	Cut-bank	Pro-File 1	Pro-File 2	Pro-File 3
Flakes	1	--	1	1
Core	--	--	--	1
Bone	15	--	--	--
Charcoal (Grams)	--	91	25	--

Flotation

A five liter sample of fill was taken from the hearth area of Feature 1. Artifacts recovered by flotation include 16 chips, burned earth, quartzite, limestone, sandstone, charcoal, and bone (Table 6.15).

Table 6.15 Artifacts Recovered By Flotation of Feature 1.

Test Unit Level (cm)	Profile 1 Feature 2 390
Chips	16
Bone	1
Quartzite (Grams)	0.2
Limestone (Grams)	5
Sandstone (Grams)	30
Burnt Earth (Grams)	5
Charcoal (Grams)	0.1

Interpretations

Based upon the present and past investigations, 14JF409 is a mulitcomponent Plains Archaic site. Previous collections from the surface component indicate a wide variety of activities including food processing, hunting and chipped stone tool manufacture took place. Our investigation provided additional support for tool manufacture and maintenance. The lower components in the cut-bank are represented by two hearths discovered during the present investigation and Archaic tools and projectile points recovered during previous investigations. These indicate activities such as hunting, butchering and cooking.

Charcoal samples were obtained from Features 1 and 2. A radiocarbon date of 8220±350 B.P.: 6270 B.C. (Beta 29435) from Feature 1 is the oldest absolute date from a site in northeastern Kansas and indicates an Early Archaic occupation. This date is substantiated by the presence of two point styles in the Reichart collection: a reworked Plainview/Meserve; and a side-notched lanceolate point with a concave base, similar to the Graham Cave Notched type. A radiocarbon date of 5710±100 B.P.: 3760 B.C. (Beta 29436) from Feature 2 supports the previous designation of a Middle Archaic, Munkers Creek phase occupation. The contrast in the sedimentological matrix of both of these features in conjunction with their differing radiocarbon dates supports an interpretation of two distinct occupations of the site during the Archaic period. Additional interpretation of this significant site is provided in chapter 10.

Recommendations

It was determined by excavations that the surface component at 14JF409 contained inadequate content and integrity to be nominated to the National Register. Subsurface components were also relocated and tested during our investigations. The buried components are now known to contain evidence of the oldest absolutely dated prehistoric occupations of the project area. The stream terrace may yet contain other features or artifact concentrations like that described herein. The nature, extent and stratigraphic integrity of this evidence promises to provide important information about the poorly known Plains Archaic period of occupation in northeastern Kansas. For these reasons the site is considered to be eligible for the National Register of Historic Places. The cut-bank has suffered considerable erosion during the past 20 years (as much as 6 m has been removed by the Delaware River during that time; Milton Reichart, personal communication) and this process threatens to remove what is left of the buried components. Mitigation of these deposits is strongly recommended. A more detailed discussion of potential research goals for any future investigation of the Cut-Bank site is presented in chapter 10.

14JF410

Name: Unnamed **Recorded:** Reichart 1971
Cultural Affiliation: Plains Woodland
Topographic Setting: Stream Bank **Elevation:** 270 m msl
Parent Material: Alluvium **Slope:** 0-2 %
Drainage: Delaware River **Site Size:** Indeterminate
Ground Cover: Grass,brush,timber **Land Use:** Wildlife
Surface Visibility: 0-10% (50-100% along cut-bank)
KVE Investigations: August 12, 1988

Previous Investigations

This cut-bank site was recorded by Milton Reichart in 1971 when artifacts were seen exposed on the bank along the east side of the Delaware River. Artifacts noted then included pieces of burned limestone of "an apparent hearth" and pottery fragments indicative of a Plains Woodland occupation (Fig. 6.4e; State of Kansas Archaeological Site Survey Form). Reichart's collection at the Kansas State Historical Society also includes the remains of a bison metatarsal (Fig. 6.4c-d) and a mano (Fig. 6.4f).

Geomorphic Setting

The unnamed site 14JF410, located approximately .5 km south of 14JF409, is in a similar topographic and geomorphic situation. It occurs in association with the narrow low (T-1) terrace remnant between the Delaware River and the bedrock valley wall. Consequently, the surface soil at the site is mapped as the Kennebec series by Dickey and others (1977). As at the former site, the soil is buried by approximately 60 cm of laminated sediments resulting from historical overbank flow (Fig. 6.12). In contrast to the former site, the terrace abuts against a well defined strath terrace cut on the Upper Pennsylvannian-age Topeka Limestone.

A backhoe trench was placed perpendicular to and 2 m from the stream bank edge in order to expand upon information provided by two profiles cut into the channel bank. Table 6.16 provides chemical and physical data obtained from the trench. The weakly developed surface A horizon and the buried A horizon are evidenced by above average levels of organic matter. In order to determine the approximate time of initial soil development, a radiocarbon age was obtained on a sample of soil humates from the lower-most 5 cm of the buried A horizon. The date obtained, 1000$\pm$70 yr B.P.: A.D. 950 (Beta-29656), provides a minimum age on the initiation of floodplain stability such that pedogenesis could begin. Therefore, it appears that the terrace surface was no longer undergoing significant vertical accretion beginning about 1000 years ago. It is assumed that a similar radiocarbon age would be realized from the buried soil at site 14JF409.

Figure 6.12. Buried soil horizon in Profile 1 at 14JF410.

Table 6.16. Chemical and Physical Sediment Data from Trench 1 at 14JF410.

Sample No.	Depth (cm)	Soil Horizon	Particle-size (%) Sand	Silt	Clay	Color (Munsell-moist)	LOI (%)	pH
10	0-10	A(?)	2(M-F)	73(MF)	25(F)	10YR 2/2	6.34	7.22
9	15-20	C	1(VF)	70(C)	29(F)	10YR 2/2	6.36	6.90
8	35-40	"	2(F/VF)	81(C)	17(F)	10YR 2/2	3.91	6.69
7	53-58	"	1(F/VF)	76(C-F)	23(F)	10YR 2/2	4.38	6.42
6	60-65	Ab	1(VF)	65(C)	35(F)	10YR 2/2	5.55	6.47
5	90-95*	"	2(F/VF)	67(MF/C)	31(F/C)	10YR 3/1	5.78	6.38
11**	88-97	"	1(VF/F)	75(MF/C)	25(F)	10YR 2/2	5.62	6.69
4	120-125	AB	1(VF)	71(C/MF)	28(F)	10YR 2/2	4.70	6.38
3	154-160	C1	2(F)	73(MF/C)	25(F)	-----	4.56	----
2	190-197	"	1(VF)	56(C)	44(F)	2.5Y 3/2	4.31	6.34
1	215-220+	"	1(F/VF)	79(C-F)	20(F)	-----	3.56	----

* soil humate-derived radiocarbon age of 1000 ± 70 yr B.P./A.D. 950 (Beta-29656)

** duplicate sample

The particle size data do, however, indicate that the upper 2 m of alluvial fill differ texturally between this and the former site. Alluvium at this site is significantly less sandy and higher in silt and clay content, particularly the latter. One explanation, which is not completely satisfactory, is that the alluvial fills are of two different ages with that at 14JF409 being the older as evidenced by oxidation of sediments (red hues) and burial of Archaic vs Plains Woodland cultural material. The scope of the present study precludes an in-depth investigation of the question.

1988 Investigations

14JF410 is a cut-bank located on the east bank of the Delaware River. The site was relocated July 25 and investigated August 12. At that time the surface of the stream bank was covered by tall grass, brush and light timber with poor (0-20 %) visibility (Fig. 6.13). The cut-bank was relatively vertical and presented a clean face with 100 percent visibility from the surface to a depth of approximately three meters. No cultural material was observed *in situ* during inspection of the cut-bank several meters each direction from the site location.

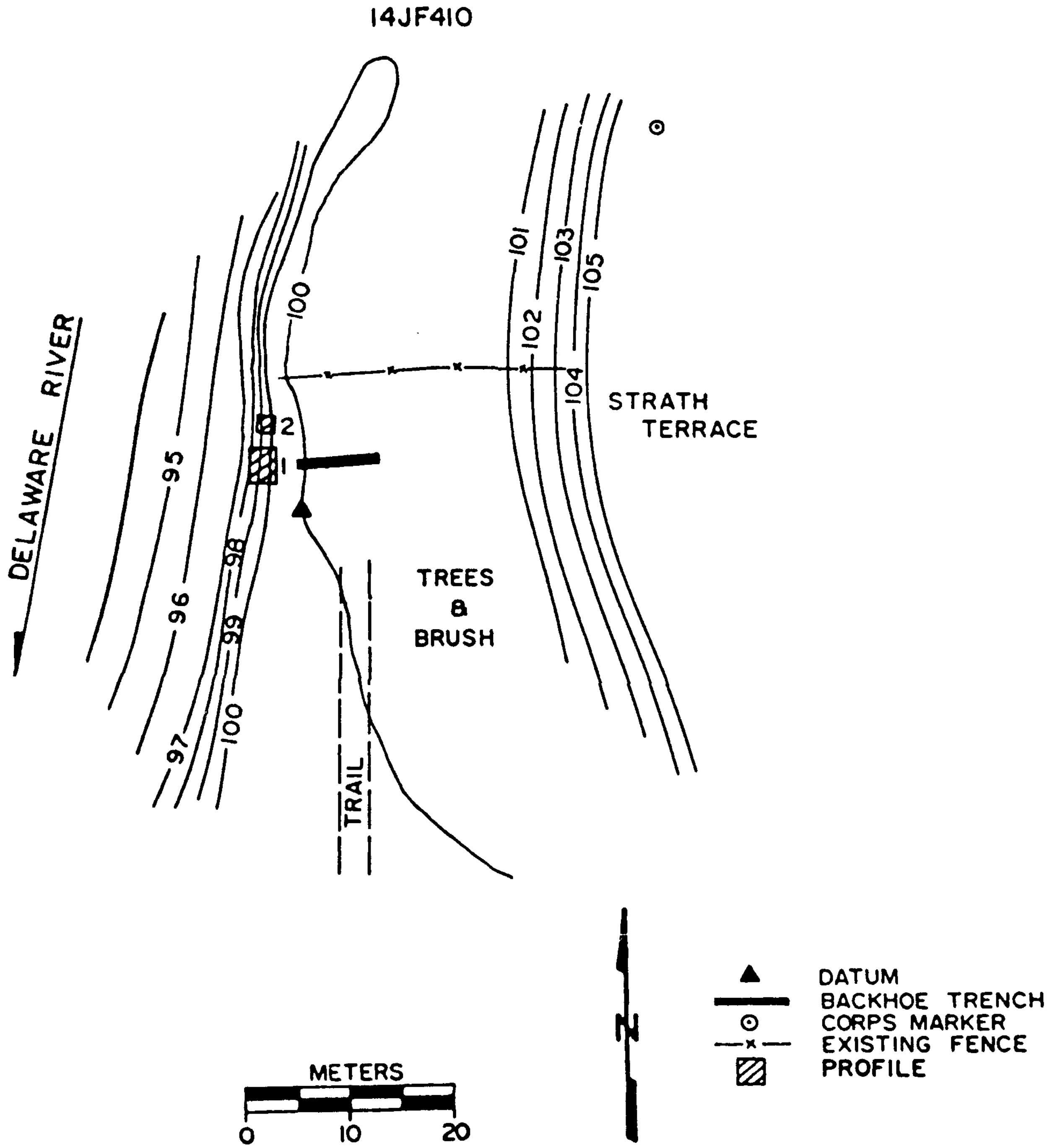


Figure 6.13. Map showing location of profiles and backhoe trench at 14JF410.

Two profiles and a backhoe trench were excavated at the site. With the exception of a quartzite cobble noted ex situ near the foot of the talus slope, our investigations failed to reveal any evidence of the feature recorded in 1971.

Assemblage

No artifacts were obtained from our investigations at 14JF410.

Interpretations

The data recovered during the original investigation of the site indicate a possible Plains Woodland campsite. Unfortunately, little else can be said of this site.

Recommendations

Given the fact that the feature noted by Reichart at the time of the site's discovery was not observed during the present investigations and no additional cultural materials were discovered, a recommendation of National Register eligibility can not be supported.

14JF414

Name: Senn's Hill **Recorded:** Reichart 1971
Cultural Affiliation: Late Archaic? (Black Vermillion phase); Plains Woodland (Grasshopper Falls phase?); Plains Village; Historic Euroamerican.
Topographic Setting: Upland Ridge **Elevation:** 285-288 m msl
Parent Material: Glacial till (?) **Slope:** 3-7%
Drainage: Delaware River **Site Size:** 20,700 m^2
Ground Cover: Milo; locust tree grove
Surface Visibility: 60-70% **Land Use:** Agriculture
KVE Investigation: August 5-10, 1988

Previous Investigations

The site was first recorded by Milton Reichart in 1971 and revisited by him in 1972, 1980, and 1981. During his 1972 visit Reichart made a sketch map, plotting shovel tests, artifacts and artifact concentrations. The site was recorded as a lithic scatter covering an area of 5 acres, with a burned stone concentration in the northern portion of the site and an historic farmstead in the southern portion. Reichart recovered ten projectile points and point fragments, drill fragments, two celts, four grooved axes, two scrapers, numerous manos and hammerstones, a metate, and flaking debris (e.g., Figs. 6.14-16). Eight of the projectile points indicate a Woodland occupation, and the two remaining points suggest Plains Archaic and Plains Village components.

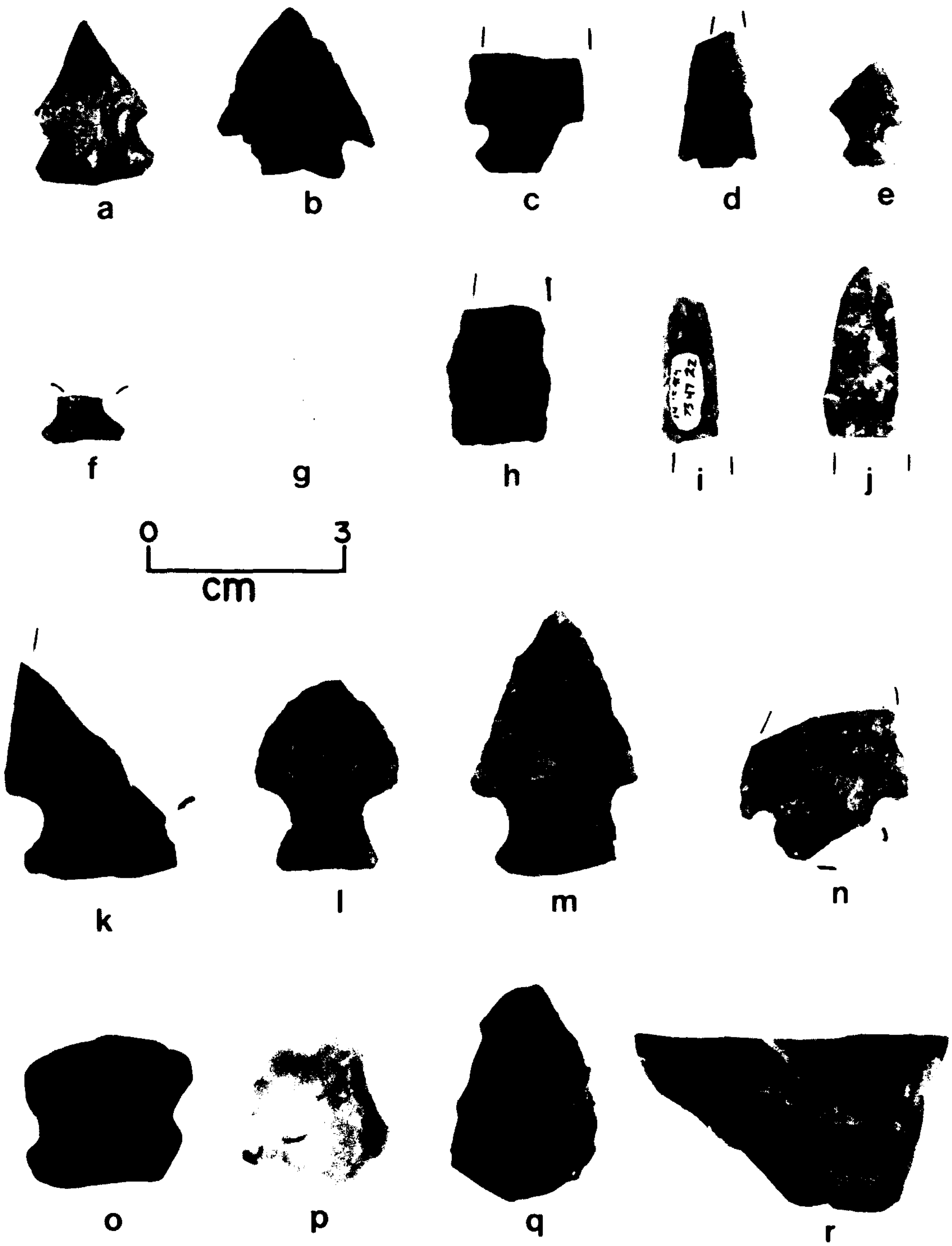


Figure 6.14. Selected artifacts from 14JF414. a) reworked corner-notched dart point b-c) corner-notched dart points (c-JF414880246) d-f) Scallorn arrow points (f-JF414880161) g-h) unnotched arrow points (h-JF414880223), i-j) drill tips k-n) corner-notched dart points (l-r) JF414880245, JF414880222, JF414880219, JF414880221), o) hafted scraper, JF414880242 p-q) end scraper (p-JF414880228) r) lateral view of core, JF414880232. Artifacts a-b, d-e, i-j, and q are in the Reichart collection, Kansas State Historical Society.

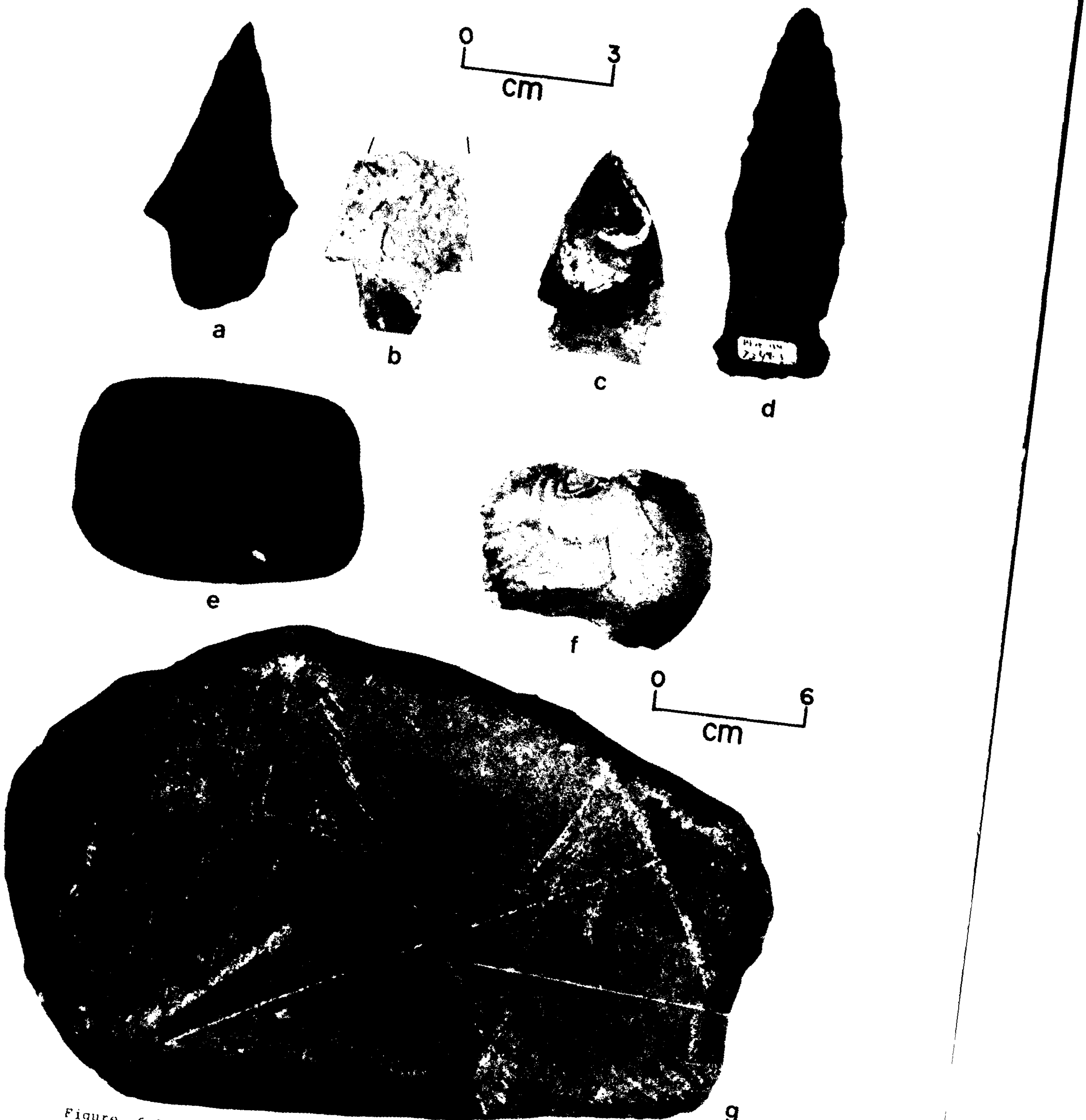


Figure 6.15. Selected artifacts from 14JF414 in the Reichart collection, Kansas State Historical Society. a-b) contracting stemmed dart points c) expanding stemmed dart point d) side-notched biface e) mano f) chipped- stone axe g) metate. Artifacts e-g are to 6 cm scale.

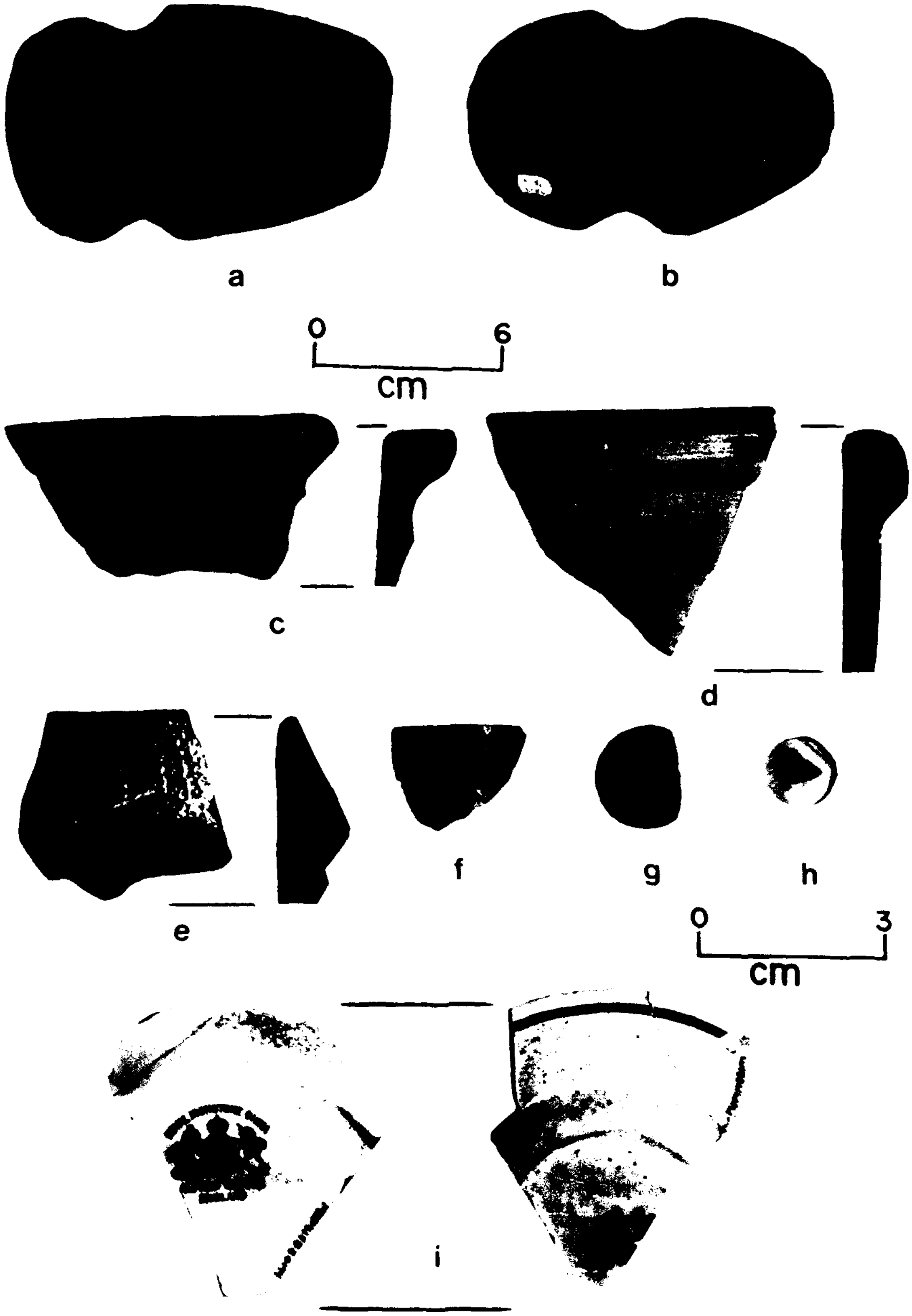


Figure 6.16. Selected artifacts from 14JF414. a-b) full-grooved axes (Reichart collection, *KSHS*) c-e) historic stoneware rim sherds f) glass bottle top g) four-hole bone button h) two-hole shell button i) earthenware tea saucer with maker's mark. Artifacts g and h are to 3 cm scale.

The site was investigated by Environmental Systems Analysis in 1985. These investigations included an intensive pedestrian survey, two shovel tests and numerous soil probes. The survey resulted in the recovery of more than 200 artifacts, the majority of which consisted of limestone from a 1 x 10 m transect in the northern portion of the site near the burned stone concentration described by Reichart. Artifacts located during this survey were suggested to be indicative of a Late Archaic (Black Vermillion phase?) occupation reflecting a variety of activities, including hunting, butchering, hide working, cooking, chopping, woodworking, tool manufacture, and seed and pigment processing; (Parisi 1987:150). A single triangular point from this survey also supports the identification of a Plains Village occupation. Although described as having been extensively disturbed by agricultural activities, the site was suggested to retain some areas of intact subplowzone archaeological deposits. On the basis of that finding and the apparent presence of an Archaic component, the site was recommended for further testing to determine its National Register eligibility (Parisi 1987:150).

Geomorphic Setting

The Senn's Hill site (14JF414) is located on an upland interfluve at the confluence of Walnut Creek and the Delaware River at an elevation of about 285-288 m msl. Soil at the site is mapped as the Pawnee clay loam (Pc) in the Jefferson County soil survey (Dickey et al. 1977). Pawnee series soils are deep and formed on gently to strongly sloping upland surfaces. The parent material is typically moderately fine and fine-textured glacial till and glaciofluvial deposits. Further, they are classifed as fine, montmorillonitic mesic Aquic Argiudolls.

There is evidence of severe erosion and soil stripping at the site, probably due to cultivation and land movement to form field terraces. The antiquity of the soil parent material and the soil disturbance account for the limitation of cultural material to the upper few centimeters and the surface. Table 6.17 provides a description of the soil profile as exposed in Test Unit 13. A clay loam Ap horizon is situated on a strongly developed AB horizon, which is in turn underlain by a Bt horizon; the latter was exposed by a shovel pit.

Feature 1, a hearth exposed in Test Units 7-9, also exposed Ap and AB horizons. Since this feature was radiocarbon dated and partially buried in a severly eroded area, two soil samples were collected and analyzed from the north face of Test Unit 9. The results, presented in Table 6.18, indicate a notable color difference between the horizons, but similar textures. Hand probing indicated a marked increase in clay within the unexposed, underlying Bt horizon.

Table 6.17. Description of Soil Profile in Unit 13 at 14JF414.

Depth (cm)	Soil Horizon	Description
0-16	Ap	Very dark grayish brown (10YR 2.5/1) clay loam; moderate very fine granular structure; friable; slightly acid; abrupt wavy boundary.
16-30+	AB	Dark brown (10YR 3/3) clay loam; moderate fine and very fine subangular blocky structure; friable; slightly acid.

Table 6.18. Chemical and Physical Sediment Data from Test Unit 9 at 14JF414.

Sample			Particle-size (%)			Color	LOI	pH
No.	Depth (cm)	Soil Horizon	Sand	Silt	Clay	(Munsell-moist)	(%)	
2	2-5	Ap	32	65	3	10YR 2/2	4.56	6.71
1	17-20	AB	28	64	8	7.5YR 3/4	3.97	6.98

1988 Investigations

Investigations began August 5 with an intensive pedestrian survey and pin-flagging of artifacts and artifact concentrations. The site was located on an upland ridge and slope and was measured by surface scatter as 345 m north-south, following the crest of the ridge, and 60 m east-west at its widest point. The area was then in tall milo but visibility ranged from 60 to 70 percent between the rows. The site was bordered on the south and west by light timber and brush and agricultural terraces to the north and east.

The site contained a prehistoric scatter throughout the area with debitage concentrated in the northern portion of the site and quartzite and limestone scatters in the southern half. Also noted was an historic scatter consisting of artifacts and limestone rubble atop a small tree-covered knoll near the southern boundary of the site (Figure 6.17).

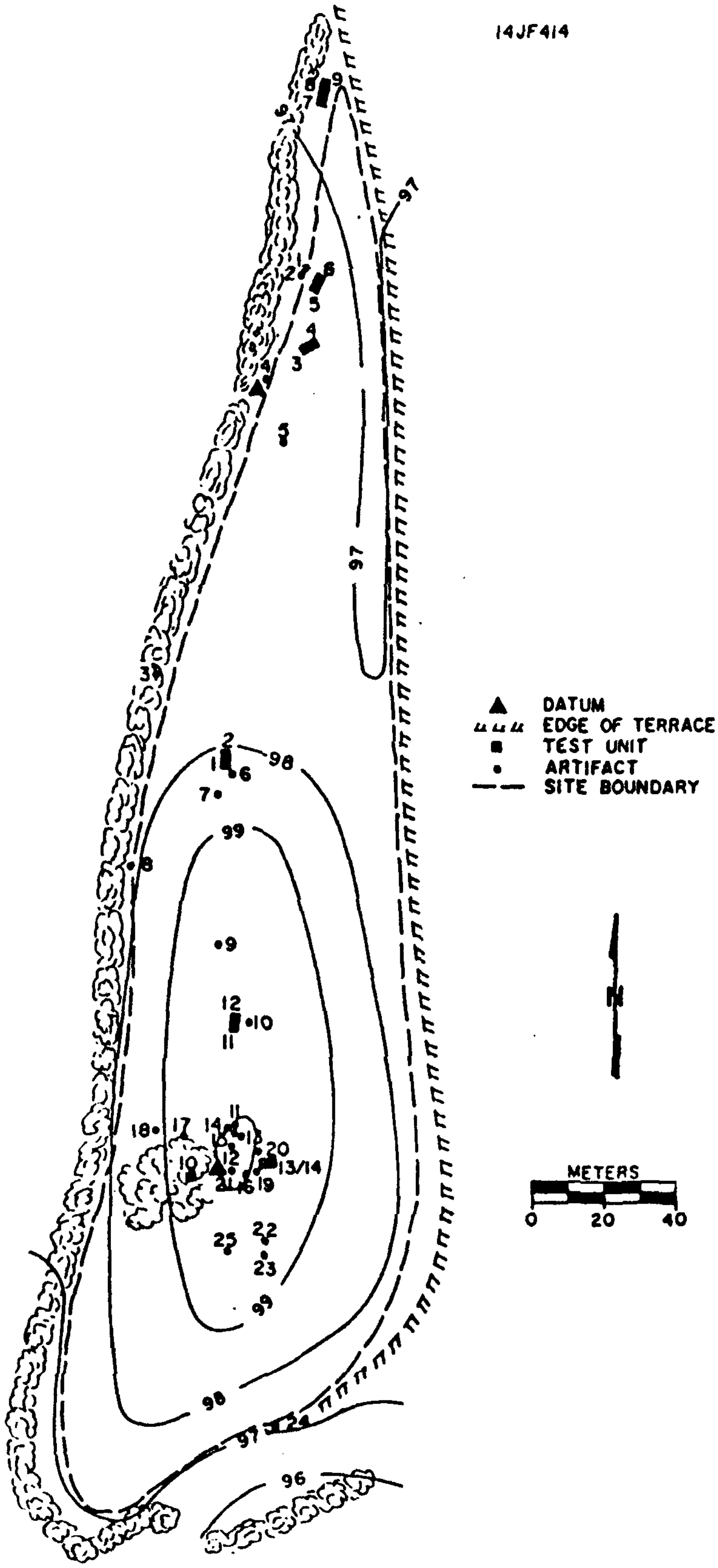


Figure 6.17. Map showing location of surface finds and test units at 14JF414.

Two data were established at opposite ends of the site. The north datum was placed in the light timber just off the plowed field, and the south datum was set within the tree covered historic scatter described above. Twenty-nine surface artifacts, including both prehistoric and historic artifacts, were mapped. (Table 6.19). Excavations began August 7 and were completed August 11. Of the 14 test units, eight (Units 1-6, 11, 12) were placed in areas of artifact or limestone and quartzite concentrations, three (Units 7-9) were placed over the burned stone concentration, and three (Units 10, 13, and 14) were located within the historic scatter (Figure 6.17).

A large sample of artifacts was collected from the test units but was limited to the upper 20 cm on the crest of the ridge where the Ap horizon was slightly thicker than along the slopes, where heavier erosion had occurred. In the latter areas, cultural material was limited to the upper 10 cm. Exceptions to this pattern were Units 10, 13 and 14, which were excavated within the area of the historic scatter. These contained intermixed historic and prehistoric artifacts to a depth of 40 cm (Table 6.20).

Two features were exposed in test units. Feature 1, a basin hearth, was located in Units 7-9, and appeared as a concentration of burned limestone on the surface that continued to a depth of 20-25 cm. The structure of the excavated portion of the feature appears as a half oval in plan view and a basin shape in profile (Figs. 6.18-20). Feature 1 was rock-lined and contained large quantities of burned earth and charcoal with a small quantity of ceramics suggesting a Plains Woodland, Grasshopper Falls phase occupation. Although Feature 1 had suffered damage due to plowing, the lower portion (from which flotation and phytolith samples were obtained) was found to be relatively undisturbed. The relative weight of burned limestone in the upper level of the feature as compared to that in the lower level (Table 6.21) and the intact nature of the surrounding sterile matrix attest to the undisturbed nature of the lower portion of the feature.

Two samples of charcoal from the feature were submitted for radiocarbon analysis in order to verify the cultural-temporal identification. The resulting assays are contradictory but one of them offers strong support for a Grasshopper Falls phase affiliation. A sample of 60 gms. provided a date of 2620±110 B.P.: 670 B.C. (Beta-29433). A sample that weighed 85 gms prior to processing yielded a date of 1200±60 B.P.: A.D. 750 (Beta-29434). The older date is unacceptable for a Woodland occupation and may record the use by the site occupants of "old wood" (Murray Tamers, Beta-Analytic, personal communication). The younger date on the other hand compares well with the only other dates for the Grasshopper Falls phase of A.D. 760±90 from the Anderson site

(14JF331; Reynolds 1979:50), which is 4 km (2.5 mi) upstream from Senn's Hill, and A.D. 600±60 from 14AT2, which is just east of Muscotah (Williams 1986:43).

Table 6.19 Surface Artifacts from 14JF414.

Artifact 1	Projectile Point (Fig. 6.14m); Biface Fragment
Artifact 2	Projectile Point Fragment (Fig. 6.14n)
Artifact 3	Projectile Point (Fig. 6.14l)
Artifact 4	Biface Fragment (Fig. 6.14h)
Artifact 5	Horseshoe
Artifact 6	Biface; Quartzite
Artifact 7	Biface Fragment
Artifact 8	Scraper (Fig. 6.14p)
Artifact 9	Rimsherd
Artifact 10	Hammerstone
Artifact 11	Core
Artifact 12	Core (Fig. 6.14r)
Artifact 13	Earthenware
Artifact 14	Earthenware
Artifact 15	Core
Artifact 16	Historic Ceramics
Artifact 17	Bottle Glass; Core
Artifact 18	Earthenware
Artifact 19	Biface Fragment
Artifact 20	Hammerstone; Scraper (Fig. 6.14o)
Artifact 21	Hammerstone
Artifact 22	Bottle Glass
Artifact 23	Biface Fragment (Fig. 6.14k)
Artifact 24	Projectile Point Fragment
Artifact 25	Shell Casing

Table 6.20 Cultural Material Recovered from 14JF414.

Test Unit	xu1	xu1	xu2	xu3	xu3	xu3
Level	1	2	1	1	2	3
(cm)	0-10	10-20	0-20	0-10	10-20	20-30
Potlids	1	--	1	--	--	--
Shatter	--	2	4	3	2	--
Flakes	12	9	15	16	12	9
Core	1	--	--	--	1	--
Tested Matl.	1	1	3	1	1	--
Ret./Ut. Flake	--	--	--	--	1	--
Biface Frag.	--	--	1	--	--	--
Hammerstone	--	--	1	1	--	--

Table 6.20 (cont.)

Test Unit Level (cm)	xu4 1 0-10	xu4 2 10-20	xu5 1 0-10	xu5 2 10-20	xu6 1 0-10	xu6 2 10-20
Body Sherds	2	--	--	--	--	--
Potlids	--	--	--	--	--	--
Shatter	1	3	1	2	1	2
Flakes	13	15	11	10	8	7
Core	--	--	--	--	1	--
Tested Matl.	--	1	--	--	--	1

Table 6.20 (cont.)

Test Unit Level (cm)	xu7 1 0-10	xu7 2 10-20	xu8 1 0-10	xu8 2 10-12	xu9 1 0-10	xu9 2 10-20
Body Sherds	--	1	--	--	1	--
Potlids	1	--	1	--	--	--
Shatter	4	--	2	--	5	--
Flakes	36	2	34	1	24	8
Tested Matl.	1	--	--	--	--	2
Charcoal (Grams)	--	142	2	--	--	--

Table 6.20 (cont.)

Test Unit Level (cm)	xu10 1 0-10	xu10 2 10-20	xu10 3 20-30	xu10 4 30-40	xu11 1 0-20	xu12 1 0-20
Body Sherds	--	--	--	--	1	1
Potlids	--	1	--	--	--	2
Shatter	--	2	--	--	6	5
Flakes	5	12	2	6	45	55
Core	--	--	--	--	--	1
Tested Matl.	--	--	--	--	1	2
Ret./Ut. Flake	--	--	2	--	2	1
Proj. Pt.	--	--	--	--	1	--
Biface Frag.	--	--	--	--	1	--

Table 6.20 (cont.)

Test Unit Level (cm)	xu12 2 20-30	xu13 1 0-10	xu13 2 10-20	xu13 3 20-30	xu14 1 0-20
Potlids	--	--	3	--	1
Shatter	--	6	2	--	5
Flakes	--	30	32	--	54
Ret./Ut. Flake	--	--	1	--	1
Hammerstone	--	--	1	--	--

Table 6.21 Cultural Material from Flotation of Feature 1.

Level (cm)		1 0-10	2 10-20	Total
Body Sherds		--	9	9
Chips		71	398	469
Bone Frag.		11	539	550
Fish Scales		--	2	2
Seeds		--	11	11
Daub		--	136	136
Charcoal	(Grams)	--	1152	1152
Burned Earth	(Grams)	6	27	33
Limestone	(Grams)	336	1883	2219
Sandstone	(Grams)	7	16	23
Quartzite	(Grams)	1	13	14

Feature 2 is located upon a small knoll in the southern portion of the site and consists of a concentration of limestone rubble, defined at 30 cm below the surface to the base of the excavation in Unit 10 (Fig. 6.21-22). Abundant artifacts (e.g, Fig. 6.16) and building materials indicated the previous presence of an historic structure. Artifacts and building rubble were scattered throughout the excavation indicating that no structural integrity remained. The presence of small amounts of prehistoric cultural material with the historic artifacts throughout the excavation may be the result of the use of heavy machinery to push the building debris into this location. A discussion of the historic component, including a more detailed analysis of the assemblage from the Historic occupation in terms of its temporal and functional information is presented in separate sections below.

Figure 6.18. Photograph of Feature 1 (basin hearth) at 14JF414.

14JF414

FEATURE 1 [illegible] LIMESTONE CONCENTRATION

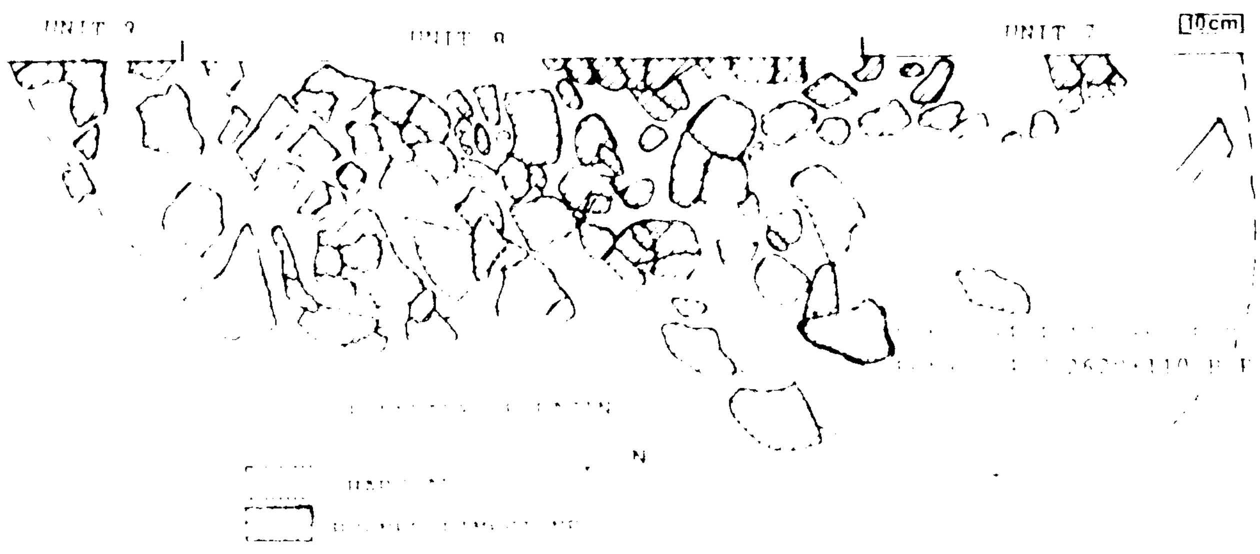


Figure 6.19. Photograph and drawing of Feature 1 at 14JF414.

14JF414 EAST WALL

FEATURE 1

BURNED LIMESTONE CONCENTRATION

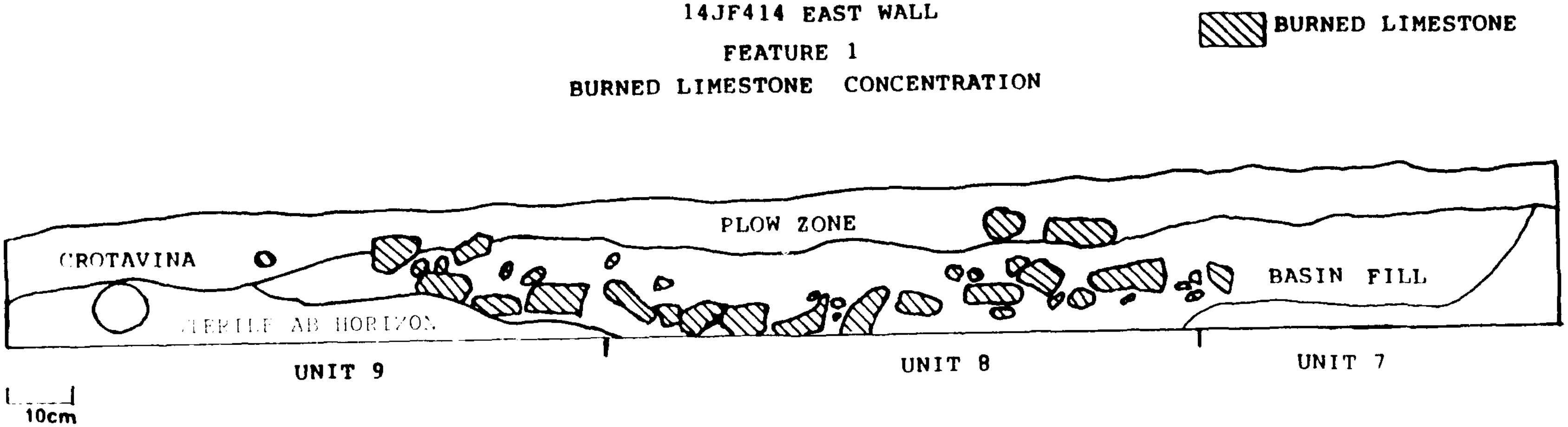


Figure 6.20. Photograph and drawing of Feature 1 profile at 14JF414. Note burned limestone scatter on surface.

14JF414 TEST UNIT 10

FEATURE 2 PLAN VIEW

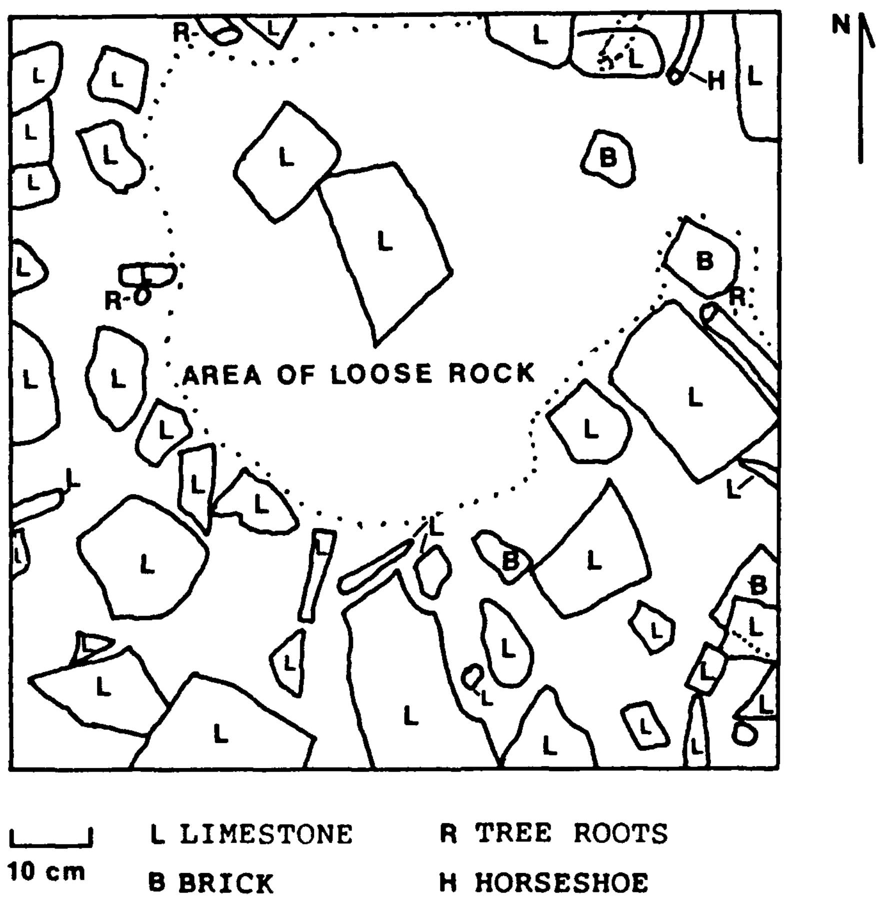
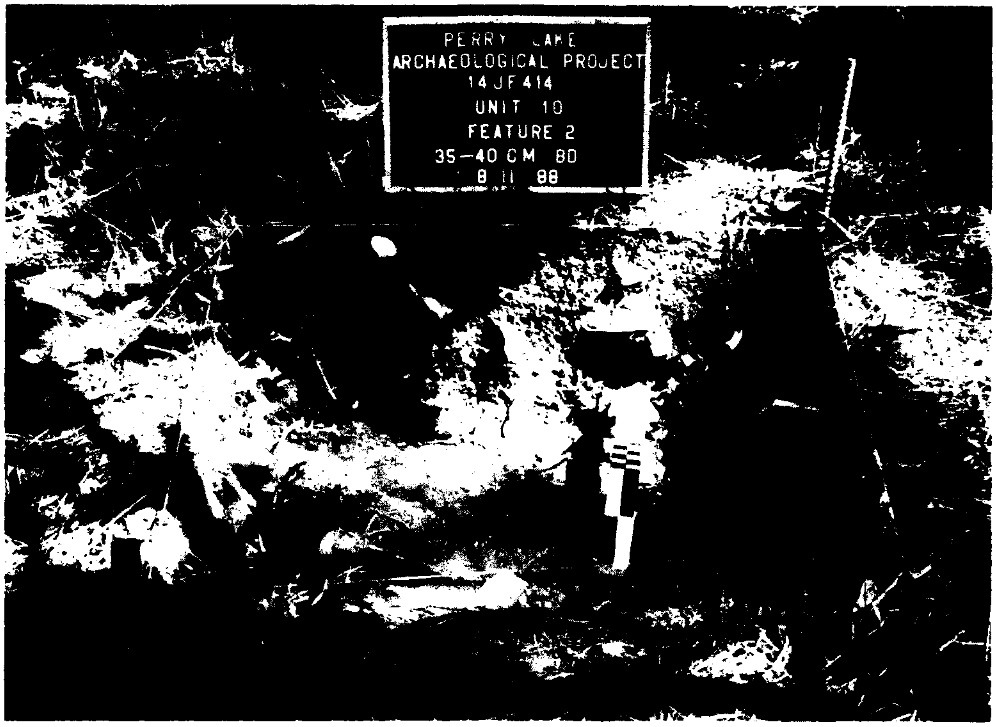


Figure 6.21. Drawing of Feature 2 (razed historic structure) at 14JF414.



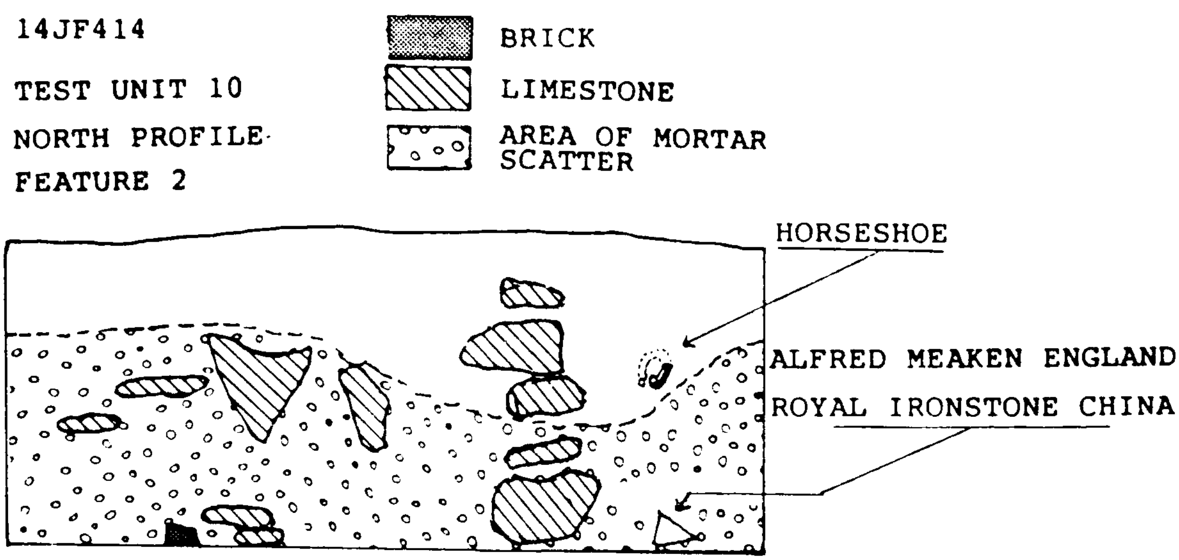


Figure 6.22. Photograph and drawing of Feature 2 profile at 14JF414.

Assemblage

The prehistoric assemblage obtained by excavation and from the surface collection includes six body sherds and one rim sherd, 577 pieces of lithic manufacturing debris, six cores and 21 formal artifacts (Table 6.20). The rim sherd and six body sherds are quite small. The rim fragment is the only sherd large enough for analysis and it indicates a Plains Village component. Formal tools include seven projectile points from the surface and one from Unit 11, Level 1 (Figure 6.14f); four bifaces (one from Unit 2, level 1, one from Unit 11, level 1 and two from the surface); one uniface and three scrapers from the surface; 10 utilized flakes, two of which were surface finds; and six hammerstones (three from the surface and three from excavations).

Flotation

The fill from Feature 1 was not screened but saved for flotation. None of the surrounding sterile matrix was included in the samples. Floral and faunal remains from the light fraction are described in Chapter 9. Material contained in the heavy fraction is presented in Table 6.21.

Analysis of Historic Artifacts

William B. Lees, Ph. D.

Introduction

The historic period artifacts from archaeological site 14JF414 described in this report were analyzed for Dr. Brad Logan of the Kansas University Museum of Anthropology. No archaeological or historical documentation accompanied these artifacts, although each was catalogued and grouped by provenience. [Archaeological data concerning the provenience of these data can be found in other sections herein--ed.] In discussions with Dr. Logan and Michael R. Fosha, also of KUMA, the site was described as one that had been severely affected by earth modification after the abandonment of the site. The provenience of the recovered artifacts was thus believed to have questionable relationship to their original location on the site. As a result, it was decided that this analysis need not use provenience as a variable, and that it focus on two key questions:

1. The chronological placement of the site, including the dates of establishment and abandonment, and

2. The general function of the site.

Each of these questions is treated in turn in the following discussion.

Chronological Placement

The chronological placement of historic sites can be evaluated through the analysis of historical documents, oral history, and the analysis of artifacts. Here, the chronological placement of 14JF414 will be interpreted solely through the analysis of artifacts recovered there by Kaw Valley Engineering. To do this, the collection was examined to identify key chronological artifacts and to develop a more general chronological profile of the materials.

Certain key chronological artifacts are described in Table 6.22. In general, the number of artifacts that provide tight chronological information was not high, and a number of these, such as the cartridges, are difficult to ascribe to the occupation of the site and could just as easily be the result of casual post-abandonment use of the area. Nonetheless, these key artifacts do provide important information on the age of 14JF414.

When examined collectively, the artifacts discussed in Table 6.22 could have been manufactured over a period in excess of 100 years. Of most interest for determining the period of use of 14JF414, however, is the range during which all of the artifacts could have been available. By reviewing the probable dates of manufacture in Table 6.22, it can be seen that all of the artifacts could have been manufactured during the 1880 to 1920 period. While this range does not necessarily mirror the date of occupation of 14JF414, it is probably a fairly close approximation. If the range of occupation were much longer in either direction, other types of artifacts or artifacts showing different methods of manufacture should have been found at this site but were notably absent.

In addition to these individual, key artifacts, a number of other artifacts provide very important chronological information about 14JF414. These include nails, window glass, and bottle glass.

A total of 151 nails and nail fragments are included in the collection, of which 47 are whole nails. Both wire and machine cut nails are represented, with 32 (68%) of the whole nails being machine cut and with 15 (32%) being wire. Both types of nails range between 2d and 10d in size, indicating similar uses on the site.

Machine cut nails were first manufactured around 1800, and by 1830 were the predominant type of nail in use in the United States. This technology replaced hand forged nail manufacture and remained the predominant technology until the introduction of the wire nail in about 1886. Between 1886 and 1900, cut and wire nails were in common use, and were often incorporated into the same structure with different

types of nails preferred for different purposes. By 1900, however, the cheaper wire nail had effectively replaced the cut nail except for a variety of specialized functions. The presence of both wire and cut nails at 14JF414 indicates that this site was in use between the 1886 and 1900 period, but does not establish a beginning or ending date for the site's use (Fontana and Greenleaf 1962).

The bottle glass from the site provides a somewhat subjective evaluation of period of occupation. Looking at the color of the 107 fragments of bottle glass, it can be seen that olive green fragments account for only 2 (1.8%) sherds and that amber colored glass accounts for 11 (10.2%) of the 107 sherds. This low importance of olive sherds and the relatively higher importance of amber glass is a relationship that would not be expected if the site had an occupation that extended substantially prior to about 1870.

A total of 172 fragments of window glass, one of which had been melted, is included in the collection. Several schemes have been developed which attempt to provide a date for a site or site context based on the average thickness of window glass sherds in an assemblage. This is based on the presumption that window glass increased in thickness through time, which is borne out by the data. Unfortunately, none of the formulas that have been developed have proven totally effective; there seems to be significant regional variation based on variation in regional supply of window glass.

The 171 unmelted sherds of window glass were measured in mm; 8 were 1.5 mm in thickness; 89 were 2.0 mm thick; 55 were 2.5 mm thick; and 19 were 3.0 mm in thickness. Using this information, dates are computed using formulas developed by Moir (1982), Schoen (1985), and Orser (1983). Both Moir and Schoen developed formulas to predict the intitial date of occupation of a site, while Orser's formula provides a mean date of occupation. Schoen's formula was developed for the Central and Northern Great Plains, while Orser's was developed for the southeastern United States. I will not review these formulae, but will simply present the derived mean occupation dates:

- Moir's formula (initial occupation date): 1902.0

- Schoen's formula (initial occupation date): 1875.9

- Orser's formula (mean occupation): 1895.5

From this, it can be seen that the dates from Moir's and Schoen's formulas, both of which predict the initial date of occupation, are at odds with each other and that the date from Moir's formula conflicts with that from Orser's formula, which predicts the mean date of occupation. On the other hand, the date of 1876 derived from Schoen's formula works

quite well with the mean date of 1895 developed from Orser's formula. If these dates are accurate, the occupation range for 14JF414 can be extrapolated to have been between 1876 and 1914 (1895+[1895-1876]). Although the accuracy of Schoen's formula has been called into question by research at 14FR308, and while Orser's formula has not been tested on the Central Plains, this date range does appear to fit well with other chronological information from this site (Lees 1986a).

Chronological Summary

All lines of archaeological evidence consulted lead to a similar conclusion: site 14JF414 was occupied during the period of about 1880 to World War I. In rural eastern Kansas, the period around about 1880 has been shown to have been one of rapid increase in the number of agricultural sites (Lees 1986b). Following World War I, the number of agricultural sites started a slow decline, and 14JF414 was apparently an early casualty of this trend. The location of this site at a significant distance from a section road may have been at least partially responsible for the abandonment of this site at that time (Lees 1986b).

Interpretation of General Function

The interpretation of site function is not an easy task even with a large sample of artifacts from a variety of site contexts (Lees 1986a). In order to develop an interpretation of site function, therefore, it will be necessary to examine a number of characteristics of the collection as well as the overall composition of the materials from this site.

Architecture is a good place to begin in the examination of site function. Architectural artifacts of importance from 14JF414 include the window glass, the nails, a hinge fragment, and a part of a rim lock. Window glass was extremely common on the site, with the 172 fragments representing 27% of the entire site collection. While window glass was used in outbuildings as well as in dwellings, such a high frequency does indicate plentiful use such as would be characteristic of a dwelling.

The picture of a dwelling is perhaps more clearly evoked by two items of architectural hardware: a fragmentary cast iron butt hinge and a cast iron box staple from a rim lock. Both of these items are elaboately decorated and, therefore, were probably used on a dwelling rather than an outbuilding.

The nails from the site are instructive as to the type of building present. Looking at the size of nails, expressed in pennyweight (d), it can be seen that both the cut and wire nails occur in sizes ranging from 2 d to 10 d. In general, nails in this size range were used for functions such as shingling, lathing, finish, and very light framing work.

Notably absent among the nails are sizes that would have been used for framing and heavy framing. This pattern has been noted in association with log structures which do not require significant numbers of nails for heavy framing purposes (Lees 1986a).

The architectural artifacts from 14JF414 are thus suggestive of a dwelling, probably of log construction. The general profile of the collection includes the types of things that would be expected of a domestic occupation, most notably ceramics, crockery, clothing items, chimney glass, a button hook, a thimble, and tin can fragments. It must be kept in mind that domestic artifacts such as these occur not only at dwelling sites but may also occur in association with outbuildings and a variety of special purpose sites with which domestic activities are not typically associated.

Several aspects of the collection do indeed call into question, if only at a provisional level, the interpretation of the tested portion of 14JF414 as having served a domestic function. First, the range of personal items is not impressive, and children's items are represented by a single possible child's thimble. The small sample size must be kept in mind here, however.

More important, perhaps, is the composition of the ceramic assemblage from this site. Contrasting refined earthenwares (handpainted, transfer printed, mold decorated, etc.) with coarse earthenwares and stonewares, it can be seen that the coarse earthenwares and stonewares make up a surprisingly large percentage of all the ceramics: refined earthenwares (n=54) account for about 64% of all ceramics while stoneware and coarse earthenwares account for a substantial 36% (n=31). Although stonewares and coarse earthenwares are without question an important part of a domestic assemblage, they typically represent a substantially smaller percentage of all ceramics than is noted for 14JF414.

Several interpretations of the ceramic evidence are possible. One interpretation is based on the socioeconomic level of the users of this site, and the other relates to site function. Another explanation related to sampling error must, however, be kept in mind. A domestic occupation of persons of a low socioeconomic level could result in a ceramic assemblage more heavily reliant on cheap, heavy earthenwares and stonewares. The great diversity of decorative types on the refined earthenwares (at least 10 types among only 51 sherds) supports such an interpretation because this may reflect a mis-matched set of tableware obtained piecemeal or secondhand.

At the same time, coarse earthenwares and stonewares would be expected to occur with greater frequency than refined earthenwares at outbuildings and other special

function sites. The ceramic evidence thus allows two viable but different functional interpretations.

<u>Functional Summary</u>

It is unfortunately impossible to present a convincing functional argument with the data from the site. The architectural artifacts do suggest that a relatively elaborate (finish work, plentiful windows, decorative hardware), log structure stood on this site and it can be inferred from this that that structure served as a dwelling. The non-architectural artifacts could easily have resulted from a domestic use of this site, especially if this use was by persons of a relatively low socioeconomic position. Different interpretations are nonetheless possible, but I tend to favor an interpetation of 14JF414 as the site of a dwelling which was either occupied by individuals of low socioeconomic position or which sampling error has made to appear was so occupied.

Historic Component Significance

This research has not specifically sought to address the significance of this site, and the full range of data with which to do so are not available to this author. Nevertheless, some insight into this question is possible.

Site 14JF414 appears to have had a relatively limited term use in the last two decades of the 19th century and the first two decades of the 20th century. It may have served as a dwelling or as an outbuilding on a farmstead. Farmsteads of limited duration occupation have been identified as having greater archaeological clarity than those with longer occupations, and can thus be identified as having a greater potential significance. At the same time, the archaeological clarity of 14JF414 is reported to have been substantially affected if not destroyed by modern earth moving activities.

Based on other research, farmsteads established about 1880 can be seen to be the most common in northeastern Kansas, and 14JF414 cannot be seen to be an extremely rare resource. This site thus appears to lack the key criteria of rarity and clarity that would signal its potential significance in terms of its eligiblity for listing on the National Register of Historic Places (Lees 1989).

Despite its apparent lack of archaeological significance, 14JF414 could potentially have significance for other reasons, foremost of which are architectural and historical. Architectural significance can apparently be ruled out because this site lacks standing buildings. Historical significance, in particular the association of significant persons or events with this site, is something

which cannot be evaluated by this author. Loss of site integrity which has diminished archaeological significance would also, however, have a negative impact on any type of significance.

Table 6.22 Description of Key Chronological Artifacts, 14JF414

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1) 880245: Olive green glass, fragment of a bottle finish. Straight fire-polished lip with applied flattened string rim. Sloped-top champagne type finish. Applied string rim indicates hand finished manufacture prior to about 1920 (Jones and Sullivan 1985:38-39).

2) 880144: Stamp applied, black pigment maker's mark on a shallow white earthenware tea saucer decorated with hand-painted brown floral decoration. Mark has "ROYAL IRONSTONE CHINA" above a royal arms device with "ALFRED MEAKIN / ENGLAND" below. The presence of "England" on marks indicates a date after 1891. "Ltd." was added to Alfred Meakin on wares made after 1897. Thus, this specimen was manufactured between 1891 and 1897 (Godden 1964:425).

3) 880156: Two shot cases:

Twelve gauge shot cases marked "U.M.C. Co. / No. 12 / SMOKELESS." The abbreviation U.M.C. Co. was used by the United Metallic Cartridge Company between 1867 and 1911 (White and Munhall 1963: 199). Smokeless powder was, however, not perfected until 1885 (Logan 1959:9). Conservatively, then, this cartridge was probably manufactured between about 1890 and 1911, and most likely during the 1890s (Cleve Mulder, firearm expert, Topeka, Kansas 1989: personal communication).

Twelve gauge shot case marked "W.R.A.Co. / No. 12 / RIVAL." The abbreviation W.R.A.Co. was used by the Winchester Repeating Arms Company between 1866 and about 1940 (White and Munhall 1963:210). This case was probably manufactured during the 1890s (Cleve Mulder 1989:personal communication).

4) 880116: Twelve gauge shot case marked "WINCHESTER / NO. 12 / REPEATER." This case was probably manufactured between about 1915 and the close of the 1920s (Cleve Mulder 1989:personal communication).

5) 880247: Metallic centerfire cartridge for a .38 caliber firearm, marked "W.R.A.Co. / 38 S & W." The abbreviation W.R.A. Co. was used by the Winchester Repeating Arms Company between 1866 and about 1940 (White and Muhnall 1963), and was manufactured for the .38 caliber Smith and Wesson. The .38 caliber Smith and Wesson was not manufactured, however, until about 1885 (Cleve Mulder 1989: personal communication).

Table 6.22 (cont.)

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6) <u>880117</u>: Metallic rimfire cartridge from a .22 caliber firearm, marked "R." Manufactured by the Robin Hood Ammunition Company between 1906 and 1916 (White and Munhall 1963:34).

7) <u>880086, 880145, 880199(2 specimens), 880212</u>: Small fragments of solarized or "sun colored amethyst" bottle glass. Solarized glass contains manganese which was used as a clearing or decolorizing agent. Manganese was commonly used between 1880 and 1915, although some use did occur in the centuries prior to this period (Jones and Sullivan 1985:13; Munsey 1970:55)

8) <u>880145</u>: Large fragment of the base and part of the sides of a solarized glass bottle, indicating a date of manufacture between 1880 and 1915 (Munsey 1970:55). Bottle was made with technology predating the automated bottle machines of the twentieth century, but could have been manufactured up to about 1920 (Jones and Sullivan 1985).

9) <u>880237</u>: Heavy aqua glass hand tooled finish for a bottle of unidentified type. Manufactured prior to about 1920 when automated bottle technology had effectively replaced earlier means of manufacture (Jones and Sullivan 1985).

10) <u>880112</u>: An iron barb used in two-strand fencing and made from a flat piece of iron. Similar to Wm. Watkins "Lazy Plate" patent of 1876 (Jenkins 1967:107).

11) <u>880136</u>: 2 seams from a sanitary seam tin can. The sanitary seam was a double-folded seam that replaced simpler soldered seams. Technology for this type of can was perfected about 1895, and major production was begun by the American Can Company about 1901, but due to initial high costs, this type of can did not predominate the market until after World War I (Rock 1980; Rosenberg and Kvietok 1982:70). Thus, this indicates a date probably after 1920 but conceivably as early as the turn of the century.

12) <u>880086</u>: Base of a small aqua glass bottle which shows neither evidence for use of a pontil (which would take the form of a scar or mark in the base) or for manufacture using automated technology (which leaves distinctive mold seams or scars on the base). The use of pontils for holding unfinished bottles had been replaced by the use of the snap case by about 1870, and automated bottle manufacturing technology was really not a factor in the market until the first years of the twentieth century. Thus, the most likely date for this artifact is between about 1870 and 1920 (Jones and Sullivan 1985).

Table 6.22 (cont.)

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13) <u>880129</u>: Fragment of an aqua glass continuous thread closure from a canning jar. This fragment shows evidence of manufacture by an automated bottle machine, which indicates a twentieth-century date (Jones and Sullivan 1985).

14) <u>880157</u>: Crown type bottle cap. This distinctive type of closure was patented in 1892 and received widespread acceptance by the turn of the century (Lief 1965:17-19). This type of closure has been used throughout its history on carbonated soft drinks and beer, and continues in common use today. Thus, this artifact dates between about 1895 and the present.

Table 6.23 Historic Artifacts Recovered from 14JF414.

<u>CERAMICS</u>

Handpainted earthenware 5 Brown floral, Green/red/blue rim bands
Cream glazed earthenware 1
Flown blue transfer 2
Blue transfer 1
Red transfer 1
Black transferware 1 edge dec. rim
Undecorated whiteware 40 cup, cup saucer, plate, burned Mold decorated whiteware 1
Bennington type earthenware 20 one mold decorated frag
Stoneware 28 crock rim (7), base
Glazed coarse redware 3 flower pot?

<u>GLASS</u>

Blue milk glass 1
Colorless pressed glass 4 faceted, beaded, tumbler base
Colorless bottle glass 42 embossed (3)
Colorless lamp chimney 111 crenulated rim
Solarized bottle glass 7
Aqua bottle glass 45 embossed (5), ct abm finish
Amber bottle glass 11 embossed (4)
Olive green 2 Sloped top chapagne finish
Melted colorless glass 5
Melted aqua glass 3

<u>NAILS</u>

Unidentified nail frags 2
Wire nail frags 3
Cut nail frags 99
3 d finish cut 2

Table 6.23 (cont.)

2 d cut nail 4
3 d cut nail 10
4 d cut nail 7
6 d cut nail 2
8 d cut nail 7
10 d cut nail 1
3 d wire nail 2
4 d wire nail 1
5 d wire nail 2
6 d wire nail 1
7 d wire nail 4
8 d wire nail 1
9 d wire nail 2
10 d wire nail
Large iron spike 1 (RR type)
Iron staple 3

<u>WINDOW GLASS</u>

1.5 mm	8
2.0 mm	89
2.5 mm	55
3.0 mm	19
Melted	1

<u>MISC ARCHITECTURAL</u>

Brick frags 9
Cast iron butt hinge 1
Cast iron box staple 1

<u>CLOTHING</u>

4 hole bone button 117mm
2 hole irridiscent black
glass button 111mm
Two hole shell button 111mm
Iron button hook 1
Small brass thimble 1 childs?

<u>AMMUNITION</u>

Percussion caps 2
Shot Cases 3
.38 caliber cartridge case 1
.22 caliber cartridge case 1

<u>MISC</u>

Tin can frags 50
Brass rivet disc 1

Table 6.23 (cont.)

Barbed wire fragment	1
Barbed wire barb	1
Iron washer	1
Wire fragments	2
Horse shoe fragment	1
Complete horse shoe	1
Sanitary seam can frags	2
Rolled copper ring	1
Mirror fragment 2 mm thick	1
Misc iron fragment	7
Crown bottle cap	1
TOTAL	637

Historic Component: Documentary Data

Complete evaluation of an historic component requires a review of historic documents pertaining to it or the region which encompasses it to determine if the component was affiliated with a particular event or person, or if it possesses intrinsic historicity or utility as an interpretive location. In an attempt to fulfill this aspect of the evaluation of the historic component at 14JF414, a review of records pertaining to the history of Jefferson County in general and Valley Falls in particular was conducted and a search of the ownership records at the Register of Deeds office in Oskaloosa, Kansas was made. The results of this research are discussed in this section.

The temporal parameters of the historic review were determined by the chronological placement of the historic component as determined by Lees' analysis of the recovered historic assemblage (see above section). According to his analysis, that component was occupied some time between 1876 and 1914. Consequently, the review focused on that period. In his early history of the settlement of Valley Falls, Andreas (1888) makes no mention of any particular event or person in connection with the site area. It is worth noting here, however, that Reichart's reference to the site area as "Senn's Hill," which we have adopted here, has some indirect connection to Henry Zen, one of the early founders of Valley Falls. Through time, the spelling of the Zen's family name changed to Senn, though the pronunciation of the earlier spelling has been retained (Milton Reichart, personal communication). The property owned by Zen, however, did not include the historic component of 14JF414. Reichart's reference stems from the ownership of the site area by Fred Senn in the 1940's (Jefferson County Register of Deeds), long after the occupation of the farmstead with which we are

concerned. We have not been able to determine the relationship between Fred Senn and the earlier Zen family.

A review of the records at the Register of Deeds office in Oskaloosa revealed that the property that contains the historic component (i.e., the NE 1/4 of the section) changed hands several times during the last quarter of the 19th century and the first two decades of the 20th century. The earliest claim to the property was made by Adam Fisher and his wife within a few years of the establishment of the Kansas territory in 1854. Adams sold the property to Hayden D. McMeeken for $2500 in the spring of 1858, but the McMeekens immediately resold an unrecorded portion of it to Henry Buckmaster for $100 and then sold the balance of the property the following spring to Albert Pemberton for $1200. The United States then granted a patent claim to the property to John Nevins in October 1858, which claim Nevins did not file until May 19, 1862. Thereafter, the property was subdivided among several heirs and/or sold to other persons throughout the last decades of the 19th century. For our purposes, we can ignore all references to deeds to that portion of the quarter-section "West of the Delaware River," since those do not include the historic component of 14JF414.

During the period in question, that portion of the quarter-section east of the Delaware River was owned by the Nevins family (John, Sarah and William) from 1862 to 1883, though a quit claim for unspecified portions of the property was also filed during that period by Levi and Nancy H. McGinnis. In 1882 and 1883, undivided portions of the property east of the Delaware River were acquired by George W. McGammon and C.C. and T.C. Lord. What improvements these persons made to the property is not known. However, it is likely that the structure described above (i.e, its razed remains) had been constructed by this time. A substantial portion of the property in question was obtained by Nettie Crosby and Lottie Kemper and also by William T. Kemper during the last decade of the 19th century. The earliest atlas of Jefferson County (1899) does not show any structures on William Kemper's land, which includes the historic component. Neither does a later atlas (1916) made when Kemper still maintained ownership of the land. It is suggested that this documentary evidence, in conjunction with Lees' analysis of artifacts from the historic component, supports a more narrow range of occupation for the structure investigated in 1988, that is, during the last quarter of the nineteenth century, and that the occupants of the structure described above were either the McGammon or Lord families.

There is no evidence that the property in question played a significant role in the early history of Valley Falls or northeastern Kansas; nor is there any evidence that the owners of the property who were affiliated with the structure described above played a significant role in national, state or local history.

Interpretations

14JF414 is a multicomponent site consisting of cultural material relating to a possible Plains Archaic (Black Vermillion phase?), Plains Woodland (Grasshopper Falls phase), Plains Village, and Euroamerican occupations. The Archaic component was suggested from a previous survey and cannot be substantiated by our investigations. The Plains Village assemblage forms a very small amount of the assemblage from the site and indicates an occupation which may have included activites related to hunting.

The numerous artifacts and a stone lined hearth (Feature 1) in the northern portion of the site indicate the major occupation of the site is attributable to the Grasshopper Falls phase of the Plains Woodland period. All excavated sites of this complex are on stream terraces and have yielded remains of lodge structures, large quantities of pottery and other debris that reflect either prolonged occupation or periodic re-occupations (cf. the Reichart and Quixote sites in this chapter). The striking contrast between these sites and the contemporary occupation at Senn's Hill suggests the latter reflects an aspect of the settlement-subsistence practices of the Woodland people in this area that is yet poorly understood. Activities inferred from the collection indicate hunting fishing, collecting of fresh water mussels and seeds, cooking and food processing, butchering, hide processing, and tool manufacture.

The historic component is represented by artifacts which suggest a late 19th to early 20th century Euroamerican occupation probably dominated by agricultural activities. Historic documents narrow this temporal range to the last quarter of the 19th century. Due to the lack of subsurface integrity and the mixing of historic and prehistoric artifacts noted in all test units in the southern portion of the site area, it is possible that much of the debris is the result of land leveling by later farmers. This disturbance may have occurred when the inferred historic structure was razed or when the agricultural terraces at the site were made.

Recommendations

Site 14JF414 has been severely disturbed by agricultural practices including terracing along the north, east, and southern perimeter of the site. Also due to its upland setting and the removal of protective vegetation, the site has been subject to erosion with consequent deflation of its cultural deposits. Because of the disturbed nature of the historic component and the shallow nature of the remainder of the site, the site is not considered eligible for nomination to the National Register. However, it is suggested that

measures be taken to preserve the remainder of the basin hearth (Feature 1) by protecting it with overburden and removing the area surrounding it from agricultural production.

14JF417

Name: Unnamed
Recorded: Reichart 1971
Cultural Affiliation: Woodland; Late Archaic (?)
Topographic Setting: T-1 Terrace
Elevation: 273 m msl
Parent Material: Alluvium
Slope: 3-8 %
Drainage: Peter Creek
Site Size: 2850 m^2
Ground Cover: Soybeans
Land Use: Agriculture
KVE Investigation: July 27-29, 1988
Surface Visibility: 50-100%

Previous Investigations

This site was recorded by Milton Reichart in 1971 as a light lithic scatter. Artifacts recovered by Reichart include small projectile points, bifaces, a drill, scraper, cores, hammerstone and one piece of groundstone rubble (Fig. 6.23). Other material noted at the site at that time included debitage, burned limestone and quartzite cobbles. Reichart suggested the site represented a Woodland occupation (KSHS site survey form).

The site was later investigated by Environmental Systems Analysis in 1985. A pedestrian survey and five shovel tests resulted in the recovery of 33 surface artifacts including two projectile points and one point fragment, four biface fragments, modified flakes, one mano and a nutting stone and lithic manufacturing debris. The projectile points were identified as Late Archaic (Parisi 1987:153), though they do not appear to be typologically distinct. Shovel tests conducted at the site by ESA failed to reveal any cultural material but did indicate a "partially intact" A horizon (Parisi 1987:153). Given this finding and the concentration of artifacts along the eastern edge of the site (i.e., along the terrace scarp), it was recommended that the site be tested to determine its vulnerability to plowing and its National Register eligibility (Parisi 1987:154).

Geomorphic Setting

14JF417 is located on low (T-1) terrace adjacent to Peter Creek at an elevation of approximately 273 m msl. The soil at the site is mapped as the Reading silt loam in the Jefferson County soil survey (Dickey et al. 1977). Reading soils, fine-silty, mixed, mesic, Typic Argiudolls, generally develop on T-1 terraces in the basin. The soil at this site is, however, more like the Wabash silty clay loam than Reading silt loam. Although five 1 x 1 m test units were

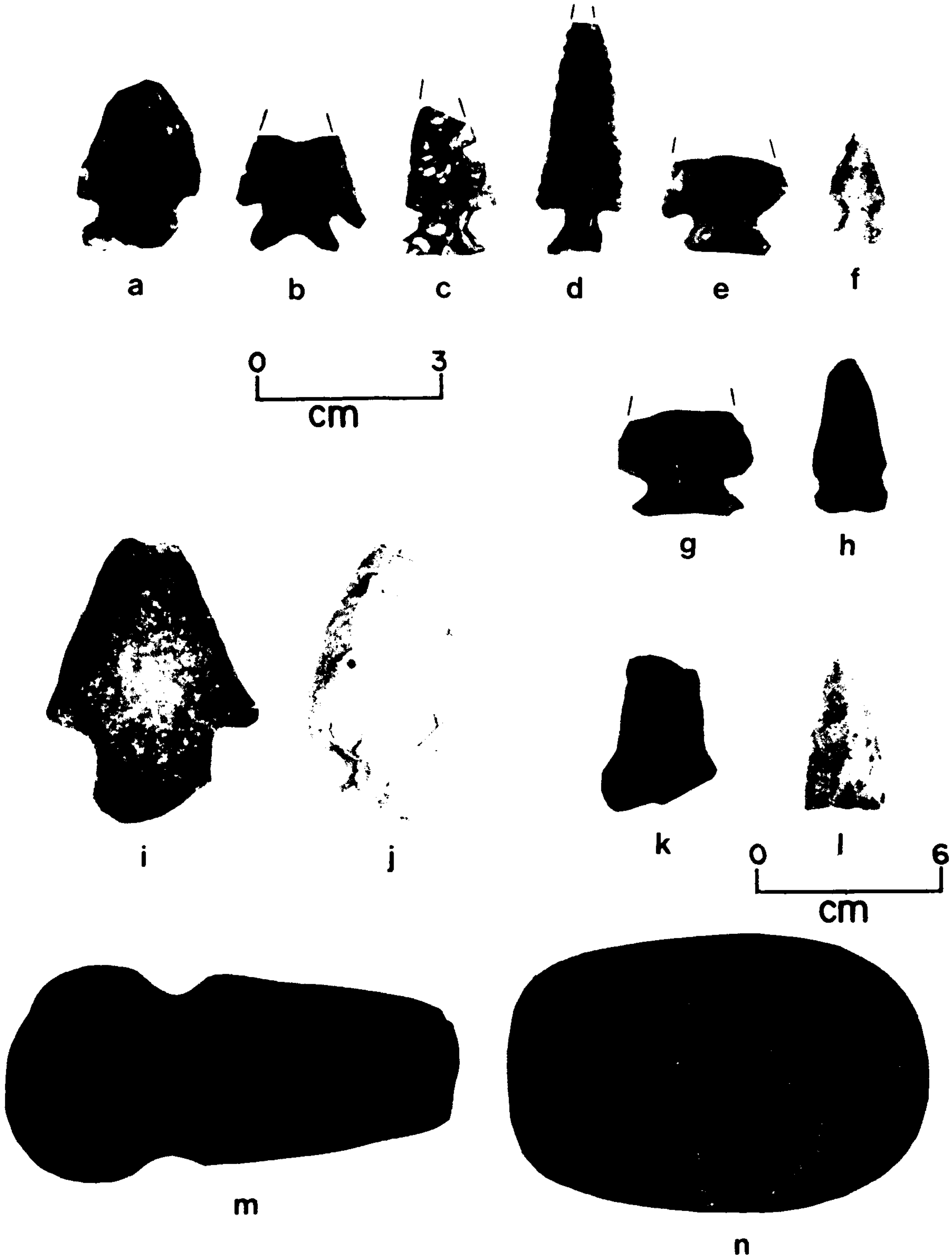


Figure 6.23. Selected artifacts from 14JF417 in the Reichart collection, Kansas State Historical Society. a-h) corner-notched arrow points i-j) corner-notched bifaces (dart points?) k) drill base l) unnotched arrow point m) full- grooved axe n) mano. Artifacts m-n are to 6 cm scale.

Table 6.24. Description of Soil Profile from Core 1 at 14JF417.

Depth (cm)	Soil Horizon	Description
0-10	Ap1	Black (10YR 2/1) silty clay loam; weak fine granular structure; friable; slightly acid; gradual smooth boundary.
10-24	Ap2	Very dark grayish brown (10YR 3/2) silty clay loam; weak fine granular structure; friable; slightly acid; abrupt smooth boundary.
24-49	BAg1	Grayish brown (10yr 5/2) silty clay; weak medium subangular blocky structure; very firm; medium acid; diffuse smooth boundary.
49-83	BAg2	Light brownish gray (10YR 6/2) silty clay; moderate medium blocky structure; very firm; medium acid; diffuse smooth boundary.
83-102	BAg3	Brown (10YR 5/3) silty clay; weak medium subangular blocky structure; common medium distinct yellowish brown (10YR 5/6) mottles; very firm; medium acid; diffuse smooth boundary.
102-188+	2C	Yellowish brown (10YR 5/6) silt loam; moderate coarse blocky structure; strong brown (7.5YR 5/6) mottles; firm; few fine black concretions; slightly acid.

excavated at the site, the deepest went only to 40 cm due to a lack of artifacts below 20 cm and the extremely clayey nature of the soil. Alternatively, soil stratigraphy was explored by extracting 7.6 cm diameter cores with a trailer-mounted Giddings soil probe. The soil description, derived from Core 1, is presented in Table 6.24. The clayey texture and gleying, reflecting a backwater area in valley bottoms, indicated the Wabash soil, a fine, montmorillonitic, mesic Vertic Haplaquoll.

Probing was extended to a depth of 1.8 m. This was sufficient to ascertain that the site is contained within the upper few centimeters of an infilled abandoned channel of Peter Creek. The fining upward of the sediments indicates the process of vertical accretion through deposition in times of overbank flow. Subsurface drainage at the site has been poor, and is probably responsible for limitation of the cultural material to the uppermost few centimeters.

1988 Investigations

14JF417 was investigated July 27, 28, and 29. At that time the site was in maturing soybeans which limited the visible surface area to 50 percent with 100 percent visibility between the rows. Artifacts and site boundaries were pin-flagged and indicated the site measures 50 m north-south and 57 m east-west (Fig. 6.24). The site is located on an extensive terrace bordered on the south and east by Peter Creek, and on the north and west by a low floodplain or abandoned channel. As was true during the previous investigation by ESA, surface artifacts, including chipped stone tools and manufacturing debris, were located primarily upon the eroded terrace scarp. Artifacts mapped include biface fragments, cores, and a quartzite cobble (Table 6.25; Fig. 6.24).

Table 6.25 Surface Artifacts from 14JF417.

Artifact 1	Biface Fragment
Artifact 2	Core
Artifact 3	Projectile Point Fragment
Artifact 4	Biface Fragment
Artifact 5	Core
Artifact 6	Quartzite Cobble
Artifact 7	Core

A datum was established within the timber along the eastern portion of the site and five test units were located on the upper portion of the terrace in areas of artifact concentration. Artifacts were generally confined to the upper 20 cm and most of these were recovered in the upper 10 cm. Only one flake was found at a depth greater than 20 cm and its depth is attributed to downward dislocation through a desiccation crack.

Assemblage

Cultural material recovered from 14JF417 consists of 82 lithic artifacts. The eight formal tools include two projectile points and six biface fragments. One projectile point was recovered from Unit 5, Level 1, and another from Unit 2, Level 1. Both are small Scallorn arrow points lacking bases. Three biface fragments were also recovered during excavations of Unit 2, Level 1, and Unit 4, Level 1. The remaining three biface fragments were plotted on the surface (Table 6.26).

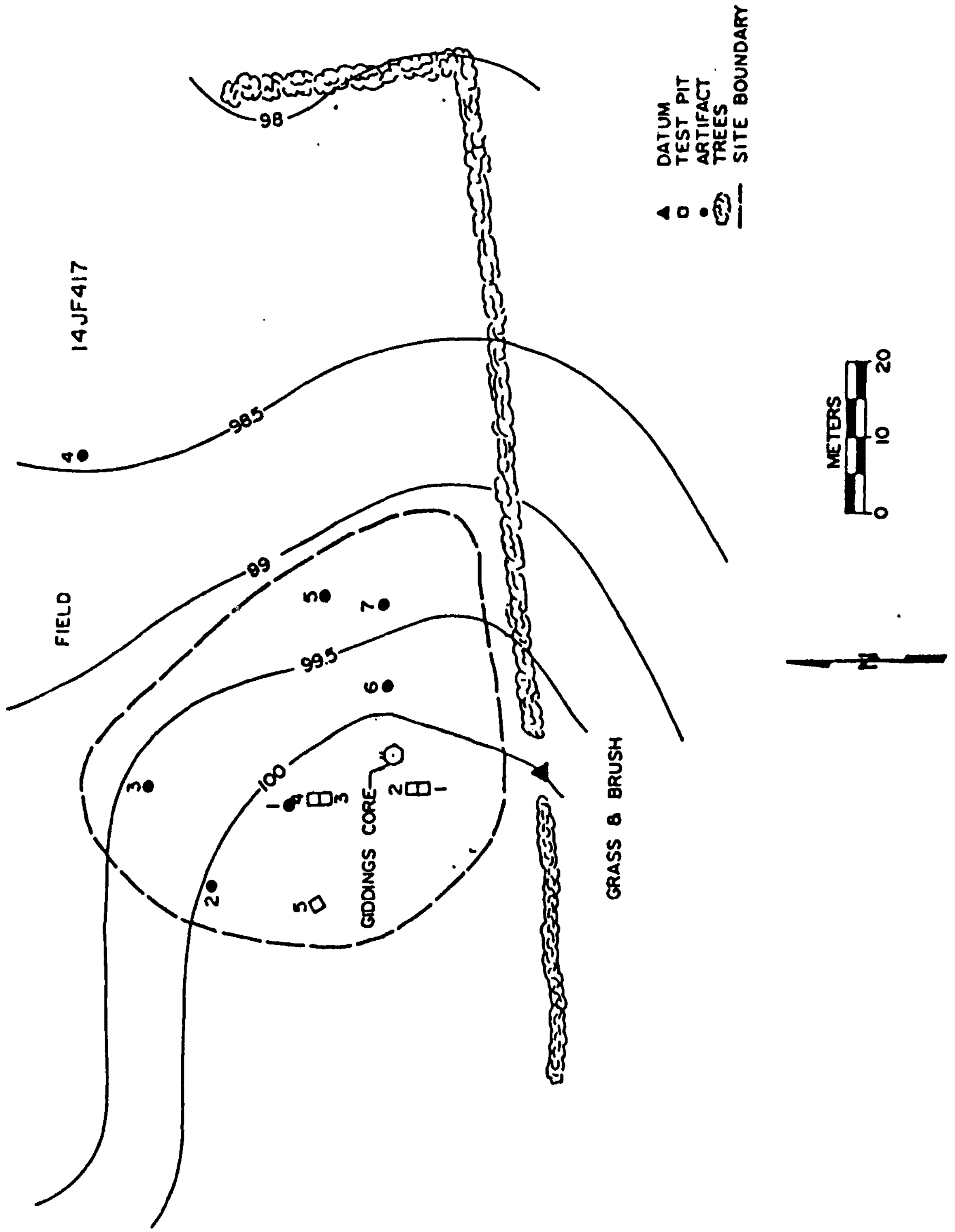


Figure 6.24. Map showing location of surface finds, test units and Giddings core at 14JF417.

Table 6.26 Cultural Material Recovered from 14JF417.

Test Unit Level (cm)	xu1 1 0-20	xu2 1 0-20	xu2 2 20-30	xu3 1 0-20	xu4 1 0-20	xu5 1 0-20	xu5 2 20-30	xu5 3 30-40
Shatter	1	--	--	--	--	1	--	--
Flakes	14	14	1	9	14	14	--	--
Core	--	--	--	--	--	--	--	--
Tested Matl.	1	--	--	--	--	--	--	--
Ret./Ut. Flakes	--	1	--	--	1	--	--	--
Proj. Pts.	--	1	--	--	--	1	--	--
Biface Frag.	--	2	--	--	1	--	--	--

Interpretation

This site is apparently restricted to the plow zone and has suffered destruction through cultivation and erosion. The Scallorn arrow points indicate a Plains Woodland occupation, an interpretation supported by artifacts recovered during the initial survey of the site by Milton Reichart. No evidence, however, was noted of the Late Archaic component identified by ESA in 1987. The small assemblage and the lack of ceramics suggest that the occupation of 14JF417 was short term; it may have been a hunting camp. Activities inferred from the assemblage indicate hunting and chipped stone tool manufacture and maintenance.

Recommendations

The sparse amount of cultural material at the site does not indicate any significant research potential. Erosion of the Ap horizon on the east side of the terrace on which the site occurs has exposed cultural deposits from the plowzone. Other artifacts are also limited to this upper plow zone, although some may have been relocated from upper levels by large desiccation cracks in the upper BAg horizon. 14JF417 does not possess sufficient research potential to warrant its consideration for the National Register.

14JF420

Name: Quixote Site **Recorded:** Reichart 1972-73
Cultural Affiliation: Woodland (Grasshopper Falls phase)
Topographic Setting: T-1 Terrace **Elevation:** 274-273m msl
Parent Material: Colluvium/Alluvium on Bedrock
Drainage: Cedar Creek **Slope:** 0-2%
Ground Cover: Mixed grasses (pasture)
Site Size: 2025 m^2 **Land Use:** Agriculture
Surface Visibility: 0-10%
KVE Investigation: September 10-11, 17-18, 24-25, October 1, 1988

Previous Investigations

The Quixote Site was recorded by Milton Reichart in 1972-73. The site was then described as two low earthen mounds 25.5 m apart and 9 m in diameter, located upon a low narrow ridge which descends from the adjacent hills to the floodplain of Cedar Creek (Reichart 1974:54). He excavated one shovel test in each mound and recovered Plains Woodland (Grasshopper Falls phase) ceramics, debitage, daub and bone from each mound. Reichart also noted some disturbance of one portion of the northern mound, possibly from a historic well or a "windmill" (Reichart 1974:54-55). It was this feature which inspired Reichart to name the site for the Man of La Mancha, who was known to tilt at such things.

Geomorphic Setting

The Quixote site 14JF420 is located adjacent to Cedar Creek on an alluvial terrace at an elevation of approximately 274 m msl. Cedar Creek has entrenched to bedrock, thereby perching the surface of the site 5 m or more above the channel bed. The soil at the site is mapped as the Kennebec silt loam, a first bottom soil developed in nearly level silty alluvium (Dickey et al. 1977).

Test Unit 1 was examined in detail. Soil stratigraphy observed is not typical of the Kennebec series because it is developed within a midden. Table 6.27 presents the soil description. The A1 horizon has developed in response to post-occupational pedogenesis, but the A2 reflects the anthropomorphic influence. Origin of the weathered bedrock fragments at the bottom of the test unit is in question without further excavation and/or coring at the site. It does appear however, that the site is situated within alluvium that was deposited on a strath terrace cut into the Upper Pennsylvanian-age Howard Limestone.

Table 6.27. Description of Soil Profile in Test Unit 1 at 14JF420

Depth (cm)	Soil Horizon	Description
0-8	A1	Very dark brown (10YR 2/2) fine sandy loam; moderate fine granular structure; friable; slightly acid; gradual smooth boundary.
8-48	A2	Black (10YR 2/1) fine sandy loam; moderate medium granular structure; friable; neutral; diffuse smooth boundary.
48-50+	2AB	Dark brown (10YR 4/3) loam; weak medium granular structure; friable; medium acid; weathered fragments of limestone bedrock.

1988 Investigations

14JF420 was initially investigated September 10 at which time the site was in pasture with poor (0-10%) visibility. The two mounds, both approximately 17 m in diameter, and about 12 m apart, were located upon a low ridge bordered on the north by Cedar Creek, on the east by a ravine, and on the west and north by gentle hillslope. A datum was established between the two mounds and a series of 16 shovel tests was excavated to determine the areal extent of the site and to locate artifact concentrations outside the two mounds (Fig. 6.26). Based upon shovel tests the area of the site was determined to be 27 m north-south and 75 m east-west. Artifacts from the shovel tests include 16 ceramic body sherds, debitage, one hammerstone, fire-cracked quartzite and quartzite cobbles, burned earth, large pieces of burned and unburned limestone, and bone. A diffuse scatter of burned earth and bone was also noticed in the bank of the nearby ravine, just to the south of Shovel Test 2.

Based on the results of the shovel tests and the size of the two mounds, three test units were excavated. Units 1 and 2 were placed on the slopes of Mounds A and B respectively to minimize disturbance of possible central features; Unit 3 was placed between the mounds in an area where shovel testing indicated the possible presence of a hearth (Figure 6.26). Artifacts were recovered to a depth of 61 cm in Unit 1 (Mound A), 62 cm in Unit 2 (Mound B), and 35 cm in Unit 3. Cultural deposits in all units were underlain by a well packed, sterile yellowish-brown silty sand.

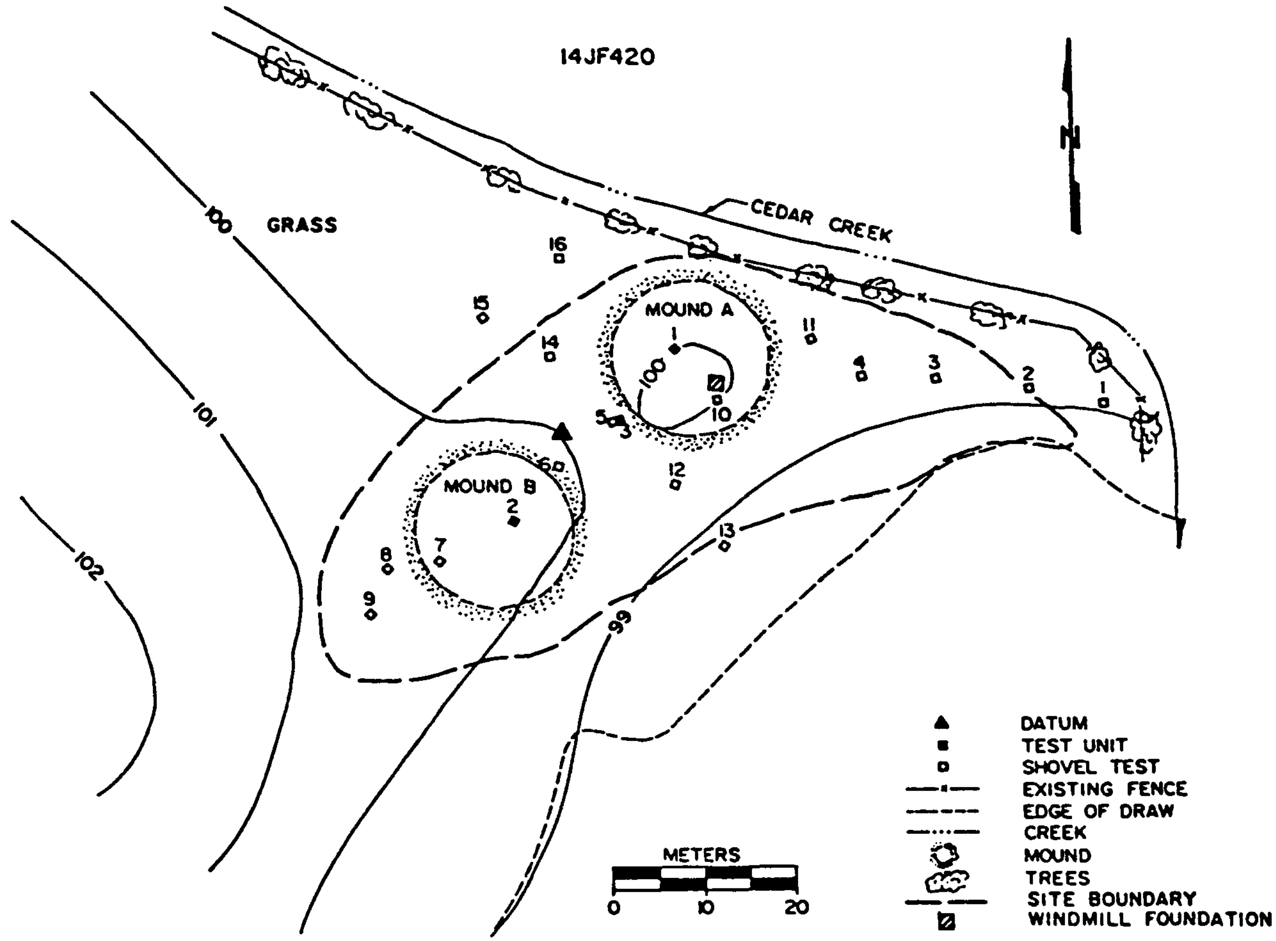
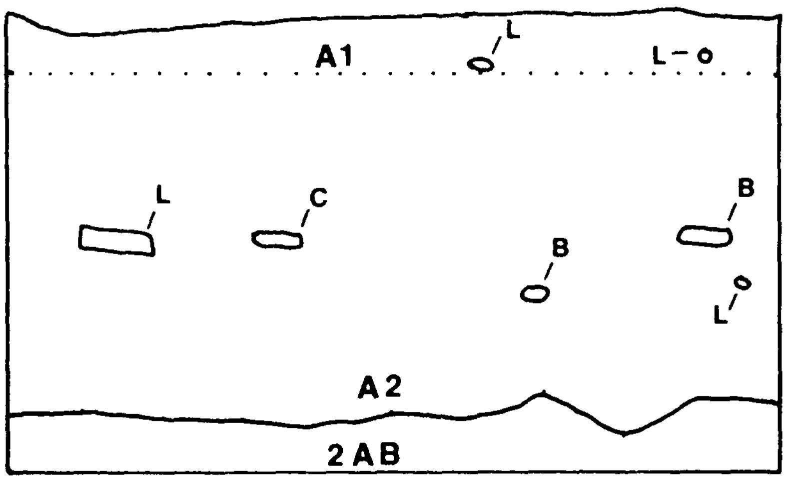


Figure 6.25. Map showing location of shovel test and test units at 14JF420.

14JF420 MOUND A

TEST UNIT 1 SOUTH PROFILE



10 cm

L BURNED LIMESTONE

C CERAMIC

B BURNED EARTH

Figure 6.26. (above) Photograph of Mounds A and B at 14JF420.
(below) Profile of Unit 1, Mound A at 14JF420.

Two features were located within the mounds. Feature 1 was encountered at a depth of 35 cm and continued to a depth of 39 cm in Unit 1, Mound A. It consisted of large sections of limestone, ceramics, daub and lithic manufacturing debris (Figure 6.27). While Feature 1 is not a structural feature, it did indicate the presence of an abundance of horizontally oriented artifacts whose primary position may directly represent one discrete period of habitation upon the mound area, or a special use area resulting from the occupation of the site area.

Feature 2 was encountered at 35 cm in Mound B, with the majority of the artifacts located between 37-38 cm below surface. Like Feature 1, Feature 2 contained large sections of burned limestone, ceramics, bone and lithic manufacturing debris (Figure 6.28). Feature 2 is also not a structural feature. However, given the identical depths and content of these features it is suggested they not only reflect similar activities but may have been synchronically related.

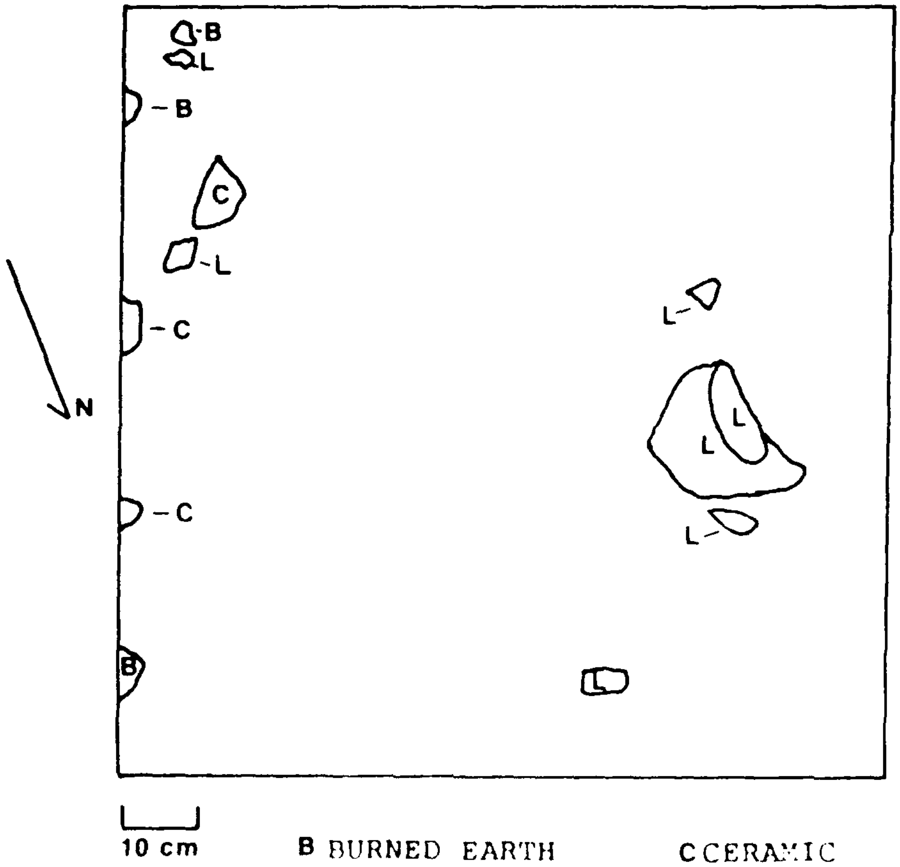
Artifacts from both Features 1 and 2 were mapped, as were artifacts from lower levels. Underlying Feature 2, at a depth of 52-54 cm, was a diffuse assortment of artifacts. A more concentrated sample of comparable debris was found from 55 to 60 cm (Fig. 6.29). The limited size of the test units was not sufficient to determine the function of the features. However, despite the fairly uniform distribution of cultural material throughout the mound units, large slabs of burned limestone that might indicate discrete living surfaces were only found in Features 1 and 2.

Assemblage

The artifacts recovered by excavation included 252 ceramic artifacts, 480 pieces of lithic manufacturing debris, five retouched/utilized flakes, six cores, six bifaces, three projectile points, two hammerstones, limestone, sandstone and quartzite, and small amounts of daub, bone and shell (Table 6.28). Charcoal, phytolith (see chapter 9), and flotation samples (Table 6.29) were also collected from the two mound units.

The ceramic assemblage contained six rim sherds (e.g., Fig. 6.30; 6.31d), 245 body sherds, and one ceramic pipe stem (Fig. 6.31a). A sample of 44 sherds used for analysis indicated a Plains Woodland, Grasshopper Falls phase occupation (chapter 8). The projectile points were of the Scallorn type and were recovered from Unit 1, Level 3 (Fig. 6.31e); Unit 1, Level 5 (Figure 6.31b); and Unit 2, Level 6 (Figure 6.31f). The bifaces consist of tips and midsections and are not age diagnostic.

14JF420 MOUND A
TEST UNIT 1 FEATURE 1



B BURNED EARTH C CERAMIC

L BURNED LIMESTONE

Figure 6.27. Photograph and drawing of Feature 1, Mound A at 14JF420.

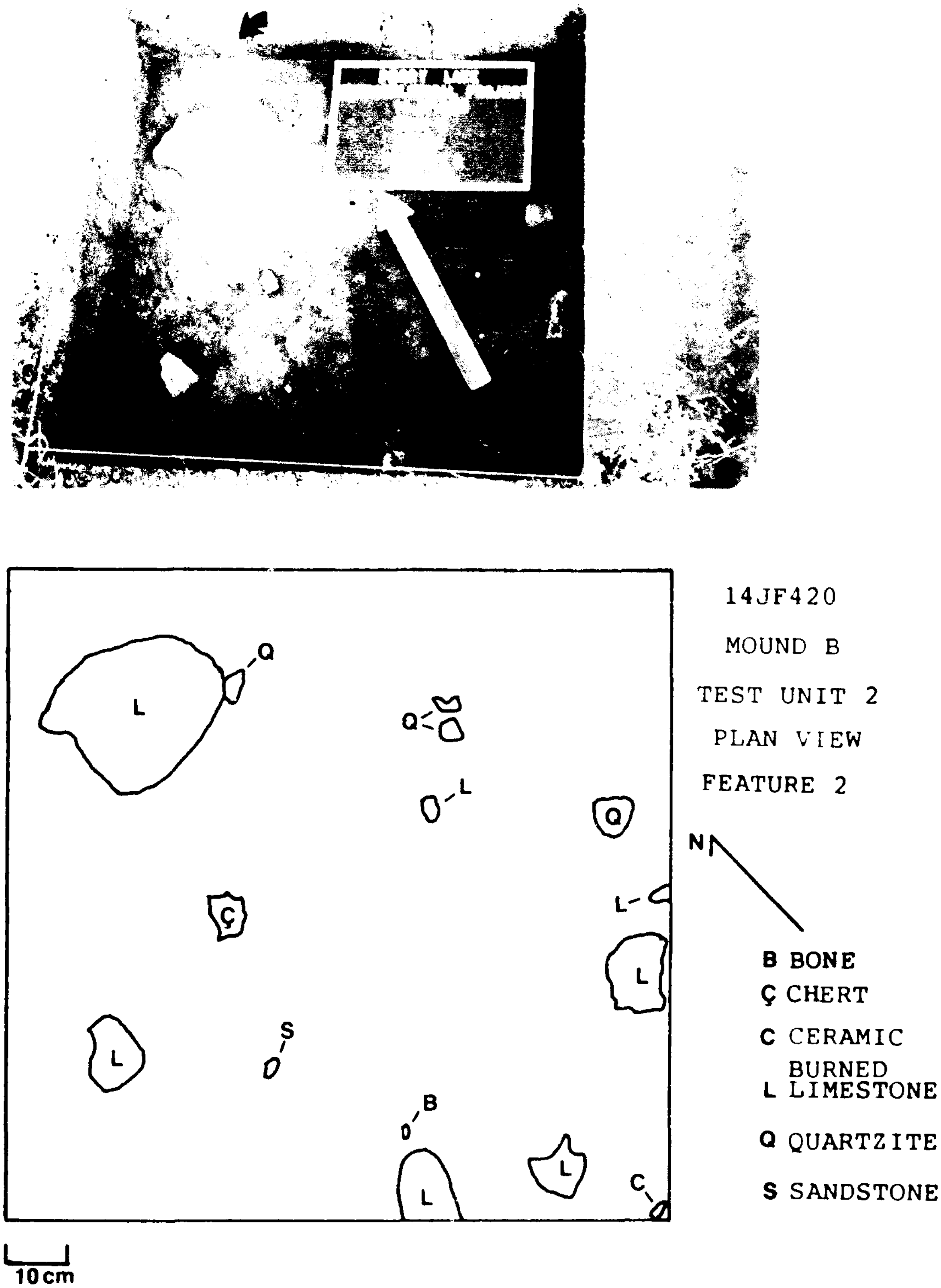
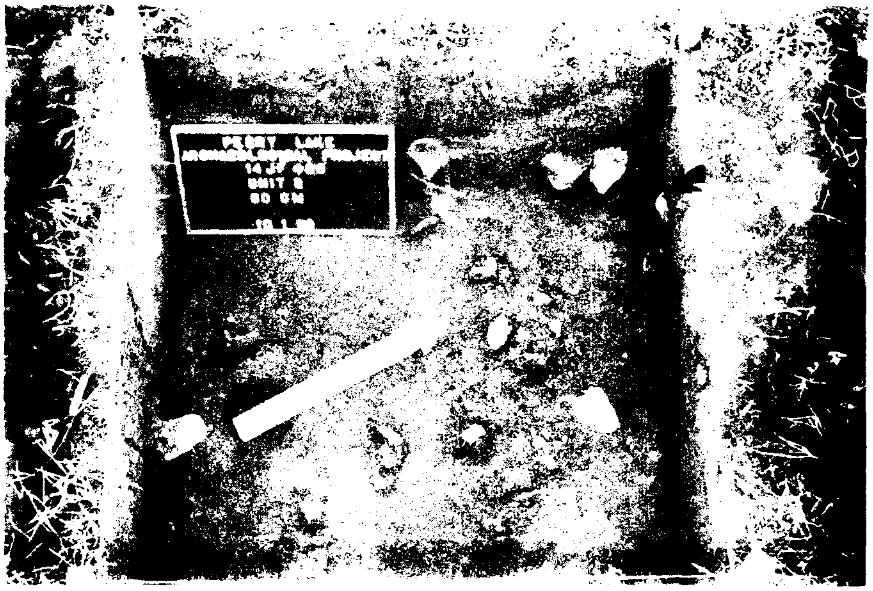


Figure 6.28. Photograph and drawing of Feature 2, Mound B at 14JF420.



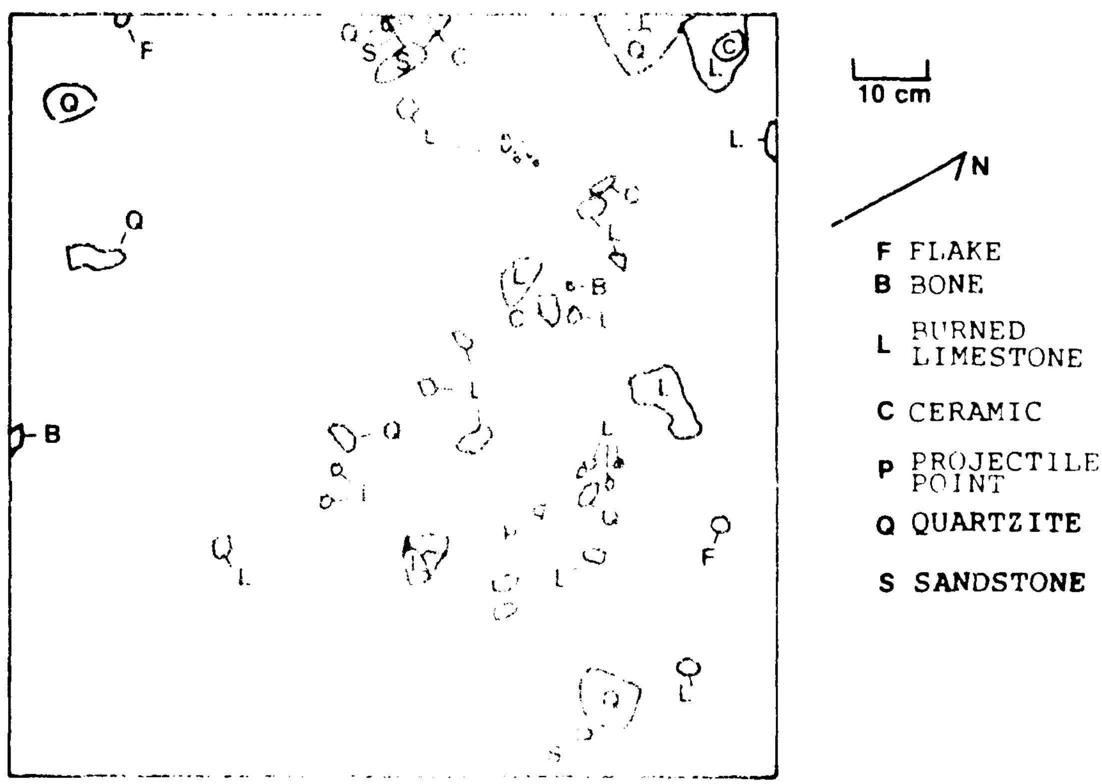


Figure 6.29. Photograph [illegible] Unit 2, Mound B (60 cm) at 14JF420. Arrow [illegible] Figure 6.28 (q.v.).

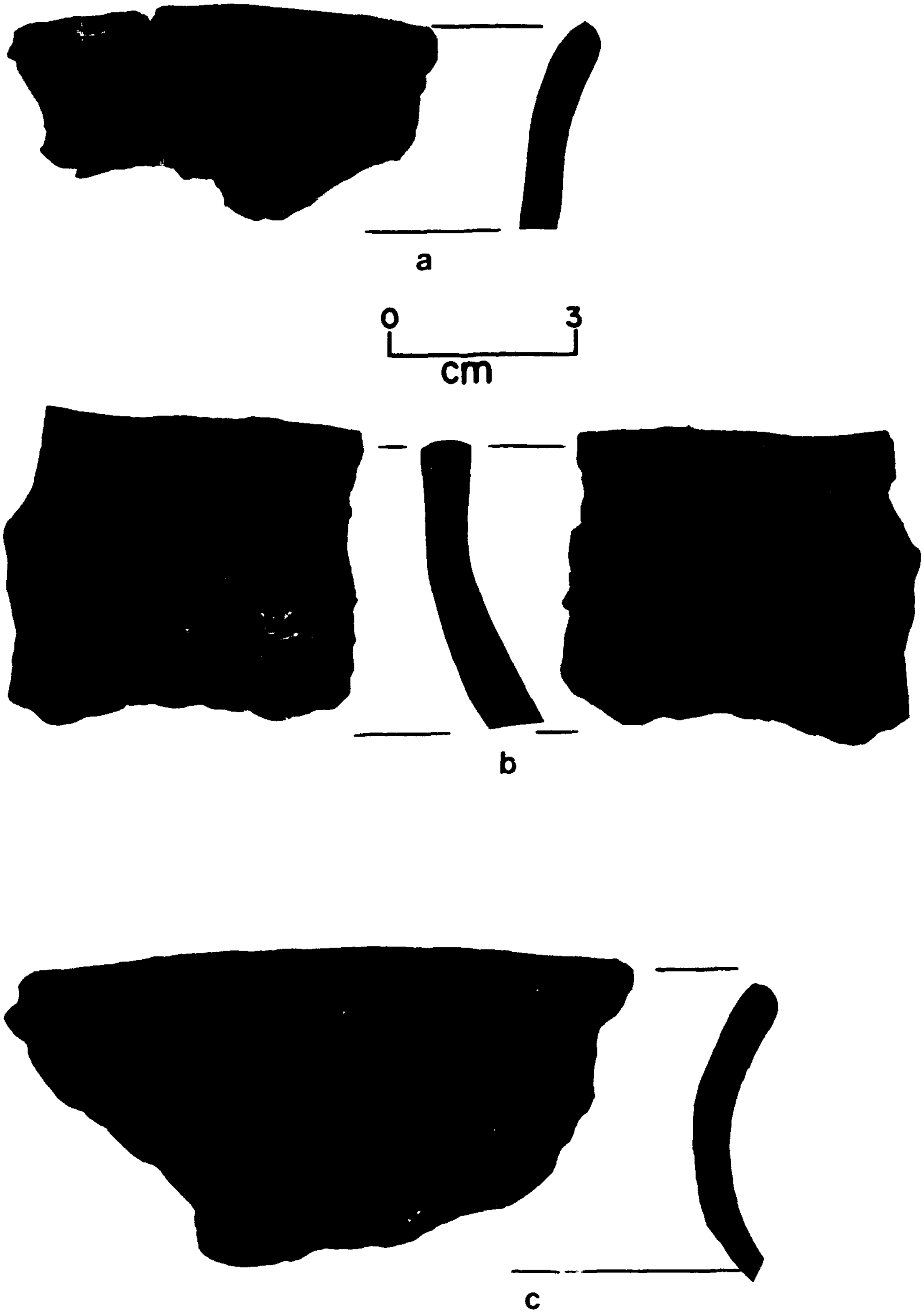


Figure 6.30. Selected rim sherds from 14JF420. a) everted with smoothed exterior, JF420880045 b) constricted with vertically cord-marked exterior and horizontally-brushed interior, JF420880127 c) everted with vertically brushed exterior, JF420880027.

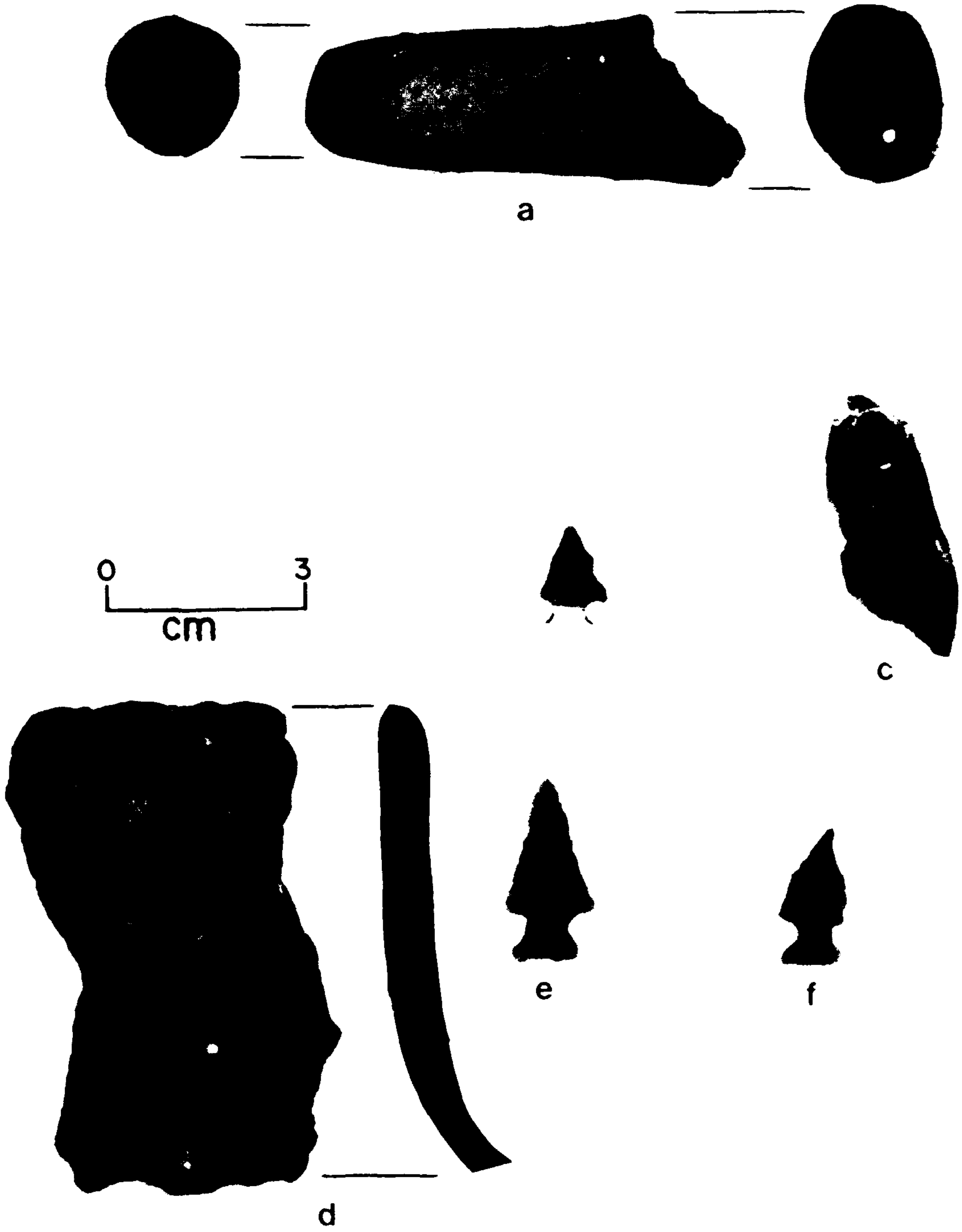


Figure 6.31. Selected artifacts from 14JF420. a) ceramic pipe stem, JF420880036 (left view shows orifice at mouth; right view at broken end) b, e-f) Scallorn arrow points (JF414880017, JF414880046, JF414880148) c) right beaver mandible fragment, occlusal view of molars, JF414880128 d) straight rim sherd, JF414880279.

Table 6.28 Cultural Material Recovered from 14JF420.

Test Unit Level (cm)	xu1 1 0-10	xu1 2 10-20	xu1 3 20-30	xu1 4 30-40	xu1 5 40-50	xu1 6 50-60	xu1 7 60-67*
Rim Sherds	--	--	--	1	2	--	--
Body Sherds	--	26	46	7	16	10	2
Ceramic Pipe Stem	--	--	--	--	1	--	--
Potlids	--	2	3	2	1	1	--
Shatter	1	6	8	4	4	--	1
Flakes	--	43	44	28	40	33	9
Cores	--	1	--	--	3	1	--
Tested Matl.	--	--	1	2	1	2	1
Ret./Ut. Flake	--	2	--	--	--	--	--
Proj. Pts.	--	--	1	--	1	--	--
Biface Frag.	--	2	--	--	--	--	--
Hammerstone	--	1	--	--	--	--	--
Bone Frag.	--	--	1	--	2	4	3

* one half level excavated

Table 6.28 (cont.)

Test Unit Level (cm)	xu2 1 0-10	xu2 2 10-20	xu2 3 20-30	xu2 4 30-40	xu2 5 40-50	xu2 6 50-60	xu2 7 60-64*
Rim Sherds	--	--	--	--	1	1	--
Body Sherds	2	24	12	17	8	15	3
Potlids	--	2	3	--	--	--	--
Shatter	1	2	1	3	1	--	--
Flakes	6	26	12	17	14	10	4
Cores	--	1	--	--	--	--	--
Tested Matl.	--	4	2	2	2	4	--
Proj. Pts.	--	--	--	--	--	1	--
Biface Frag.	--	2	--	1	--	--	--
Bone Frag.	--	3	1	8	8	22	1
Shell Frag.	--	--	--	--	--	2	1

*one half level excavated

Table 6.28 (cont.)

Test Unit Level (cm)	xu3 1 0-10	xu3 2 10-20	xu3 3 20-30	xu3 4 30-40	ST3*	ST4	ST5
Rim Sherds	--	--	1	--	--	--	--
Body Sherds	2	28	14	4	3	1	--
Potlids	--	--	1	--	--	--	--
Shatter	1	5	2	1	1	--	--
Flakes	4	35	15	9	9	--	3
Tested Matl.	--	1	1	2	1	1	--
Ret./Ut. Flake	--	1	1	--	1	--	--
Biface Frag.	1	--	--	--	--	--	--
Bone Frag.	--	--	1	1	--	--	--

* Shovel Test

Table 6.28 (cont.)

Shovel Test	ST6	ST7	ST8	ST9	ST10	ST11	ST12	ST14
Body Sherds	1	4	--	2	3	2	--	--
Potlids	--	1	--	--	--	--	--	--
Shatter	1	--	--	1	--	--	1	--
Flakes	6	3	1	1	3	5	4	1
Tested Matl.	--	1	--	--	--	--	1	--
Hammerstone	--	1	--	--	--	--	--	--
Bone Frag.	--	--	--	1	--	--	--	--

Flotation

Flotation samples five gallons (18.9 liters) in size were taken from Mounds A and B at the 40-50 and 50-60 cm levels. Material recovered from the heavy fraction included one bead made of ferrous oxide, one small rim sherd and 14 body sherds, 342 chips, bone fragments, seeds, charcoal, daub, limestone, sandstone, and quartzite (Table 6.29).

Table 6.29 Heavy Fraction of Flotation Samples from 14JF420.

Test Unit Level (cm)	xu1 5 40-50	xu1 6 50-60	xu2 5 40-50	xu2 6 50-60
Rim Sherds	--	--	--	1
Body Sherds	--	1	8	3
Beads	1	--	--	--
Chips	126	91	43	82
Bone Frags.	50	??	84	125
Seeds	--	--	??	--
Charcoal (Grams)	4	1	1	1
Daub (Grams)	12	12	11	11
Limestone (Grams)	4	2	5	2
Sandstone (Grams)	5	5	17	9
Quartzite (Grams)	2	--	9	1

Interpretations

The two mounds at 14JF420 contain artifacts indicative of a Grasshopper Falls phase occupation. Two features consisting of artifact concentrations and large slabs of limestone were located within each mound. Shovel testing also indicated the possible presence of an extramural stone hearth, though excavation of Test Unit 3 failed to reveal such a feature. It is suggested that these mounds represent habitation structures rather than extramural features such as refuse piles. Paired structures of similar size and content have been excavated at nearby locations within the Delaware River Valley (Reynolds 1979). These were located by surface scatters and were all located in areas of cultivation, a practice which would quickly obliterate the tops of low lying mounds. By leveling the surrounding area, these structures might appear as pit houses. Further evidence suggesting that Mounds A and B represent house structures comes from previous settlement pattern studies and from the excavation of a Grasshopper Falls phase mound not yet discussed fully in print (14JF350; Barr 1971).

Reynolds (1979:105) indicates the settlement pattern associated with Grasshopper Falls phase sites consists of "small isolated clusters of one or two nuclear family units occupying alluvial terraces adjacent to secondary drainages". A site which closely resembles 14JF420 is the Hamon site, 14JF350. According to John Reynolds (personal communication to Fosha), it is the only Grasshopper Falls phase house-mound to be excavated and its contents, as well as their vertical and horizontal distribution, are comparable to 14JF420.

14JF420 represents a Grasshopper Falls phase occupation site. The large amount of cultural material located within single test units of each mound indicates a fairly sedentary or extended occupation where a wide range of activities took place. Contemporaneity for the two mounds is suggested by their close horizontal and vertical relationships, similarities in the number and location of certain artifacts, counts and origins of raw lithic material (see chapter 7), and the close resemblance of diagnostic artifacts.

Recommendations

The Quixote site (14JF420) represents a permanent or semipermanent occupation by people of the Grasshopper Falls phase. While a portion of Mound A has been disturbed by the placement of a windmill, testing indicated that its impact was minimal and restricted to a two m^2 area. Because both mounds contain undisturbed cultural deposits including faunal and botanical remains as well as the possibility for structural remains, Quixote is one of the more significant sites investigated during the present project. Due to the lack of disturbance by agriculture and trees in the immediate area the site is not presently threatened by destructive forces. It is recommended that these conditions continue and that 14JF420 be considered eligible for nomination to the National Register of Historic Places. A more detailed discussion of potential research goals for any future investigations at this site is presented in Chapter 10.

14JF421

Name: Unnamed **Recorded:** Reichart 1973
Cultural Affiliation: Late Archaic (Nebo Hill phase); Plains Woodland (Grasshopper Falls phase); Plains Village (Pomona variant)
Topographic Setting: Upland Ridge **Elevation:** 290 m msl
Parent Material: Glacial Till (?) **Slope:** 3-8%
Drainage: Delaware River **Site Size:** 3300 m^2
Ground Cover: Milo **Land Use:** Agriculture
KVE Investigation: August 10-12, 1988
Surface Visibility: 80-100%

Previous Investigations

This site was recorded by Milton Reichert in 1973. He also conducted a survey, soil probe, and shovel test in the spring of 1972. His investigations resulted in the recovery of nine projectile points or point fragments (e.g. Fig. 6.32a-f, i-k), one drill (Fig. 6.32h), three bifaces (e.g., Fig. 6.32g), one mano, debitage, daub, and ten grit tempered and ten clay tempered potsherds. These artifacts were considered representative of Plains Woodland and/or Plains Village (Pomona) occupations. The presence of daub suggests a habitation structure once existed.

Reichart's test excavation consisted of a 12"x16" pit dug to a depth of 12 inches. It revealed a 6-inch thick plowzone which overlay three inches of charcoal and burned clay mix in a gray / yellow mottled soil. Evidence of rodent activity was present, suggesting the charcoal and burned clay material may have been carried below the plow zone by burrowing animals.

Geomorphic Setting

The unnamed site 14JF421 is located on a ridge top a few tens of meters north of site 14JF414 at an elevation of about 290 m msl. Soil at the site is mapped as the Shelby-Pawnee complex (Sc) in the Jefferson County soil survey (Dickey et 4al 1977). As noted earlier, Shelby-Pawnee complex soils occur on narrow ridge tops and side slopes within glacial till and glaciofluvial deposits and are classified as Typic and Aquic Argiudolls. Soil characterization was obtained from Test Unit 3, although most test units were examined.

There is evidence of severe soil erosion at 14JF421. The Ap horizon overlies a thin BA horizon. Table 6.28 provides a detailed description of the soil profile in the unit. A silty loam Ap horizon abruptly yields to a thin BA horizon, with a strongly developed Bt horizon being exposed in the bottom of the unit (Fig. 6.33). Cultivation and field terrace construction have accelerated soil erosion.

The antiquity of the parent material and degree of erosion have served to confine prehistoric artifacts to the uppermost few centimeters.

Table 6.30. Description of Soil Profile in Test Unit 3 at 14JF421

Depth (cm)	Soil Horizon	Description
0-16	Ap	Black (10YR 2.5/1) silty loam; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.
16-30	BA	Dark brown (10YR 3/3) clay loam; moderate medium granular structure; friable; medium acid; gradual smooth boundary.
30+	Bt	Dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; few films on peds; medium acid.

1988 Investigations

This site was investigated on August 10, 11, and 12. It is situated on an upland ridge northeast of 14JF414 and was in tall milo at this time with good visibility (80-100%) between the rows. The site consisted of a thin scatter of prehistoric artifacts covering an area of 3300 m^2 (Fig. 6.34). Surface artifacts, including those that were mapped (Table 6.31), consisted of a few chipped stone tools and lithic manufacturing debris. Also noted were ceramics, scattered pieces of burned and unburned limestone and quartzite, and small quantities of daub.

Table 6.31 Surface Artifacts from 14JF421 shown on Figure 6.34.

Artifact 1	Hammerstone
Artifact 2	Projectile Point (Fig. 6.35d)
Artifact 3	Projectile Point (Fig. 6.35f)
Artifact 4	Core

A datum was established near the edge of the timber which bordered the site to the northwest. Four test units were excavated in areas of artifact concentrations (Figure 6.34). Artifacts were limited to the plow zone (upper 16-20cm) and the upper portion of the Bt soil horizon to a depth of 25 cm. These included ceramics, chipped stone artifacts, lithic manufacturing debris, burned and unburned limestone, quartzite, and sandstone, and small amounts of burned earth (Table 6.32).

Assemblage

The assemblage from 14JF421 includes 17 ceramic body sherds, 211 pieces of lithic manufacturing debris, four cores, three utilized flakes, six projectile points or point fragments, three biface fragments and two hammerstones. Only six of the 17 body sherds collected were of sufficient size for analysis and these are identified as Plains Village ware (see chapter 8). A wide range in point styles is represented in the lithic assemblage. These include a lanceolate point from Unit 4, Level 1 (Figure 6.35e) and another point fragment suggestive of the Nebo Hill phase of the Late Archaic period, and a contracting stem point from the surface (Figure 6.35d). One corner-notched point fragment from the surface (6.35f) and one small Scallorn point from Unit 2, Level 4 (Figure 6.35b) are indicative of a Plains Woodland occupation. One small unnotched projectile point from Unit 4, Level 2 (Figure 6.35a) is suggestive of a Plains Village affiliation. The occurrence of the Nebo Hill point in Unit 4 (0-10 cm) and the small Plains Village point in Level 2 (10-20) indicates some mixing of cultural material has occurred.

Table 6.32 Cultural Material Recovered from 14JF421.

Test Unit	xu1	xu1	xu2	xu2	xu2	xu2
Level	1	2	1	2	3	4
(cm)	0-10	10-20	0-10	10-20	20-30	30-40
Body Sherds	8	1	3	3	--	--
Potlid	6	--	--	2	--	--
Shatter	7	3	1	4	1	--

Table 6.32 (cont'd).

Test Unit	xu1	xu1	xu2	xu2	xu2	xu2
Level	1	2	1	2	3	4
(cm)	0-10	10-20	0-10	10-20	20-30	30-40
Flakes	39	--	18	31	4	--
Core	1	--	--	1	--	--
Tested Matl.	2	--	--	--	--	--
Ret./Ut. Flake	1	--	--	--	--	--
Biface Frag.	2	--	--	--	--	--
Proj. Pt.	--	1	--	--	--	1

Table 6.32 (cont').

Test Unit	xu3	xu3	xu3	xu4	xu4	xu4
Level	1	2	3	1	2	3
(cm)	0-10	10-20	20-30	0-10	10-20	20-30
Body Sherds	--	2	--	--	--	--
Potlid	2	2	--	1	--	--
Shatter	--	4	--	--	2	--
Flakes	32	1	--	13	10	--
Core	--	--	--	--	1	--
Tested Matl.	2	--	--	--	--	--
Ret./Ut. Flake	--	--	--	--	2	--
Biface Frag.	--	--	--	1	--	--
Proj. Pt.	--	--	--	1	1	--

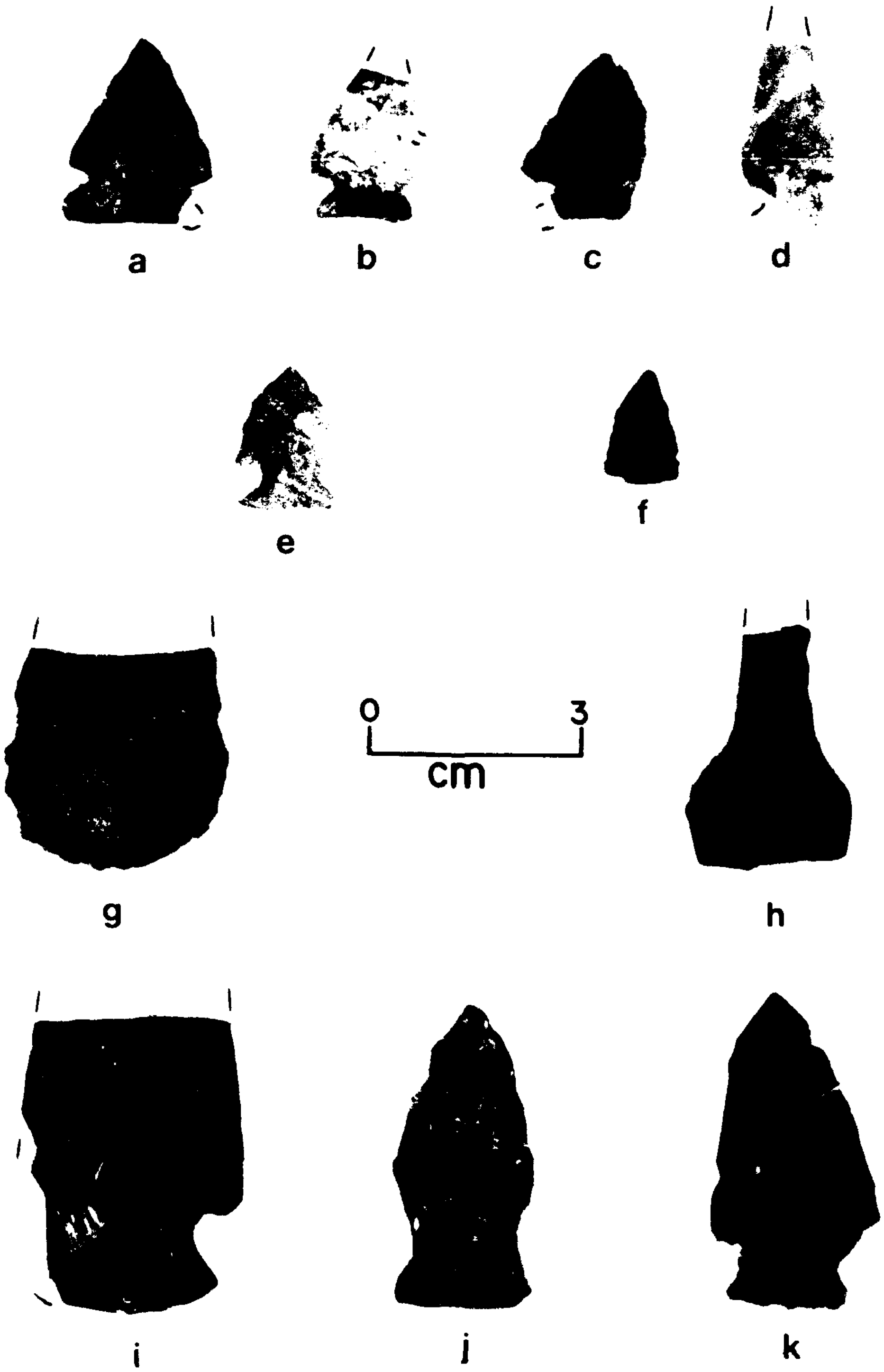


Figure 6.32. Selected artifacts from 14JF421 in the Reichart collection, Kansas State Historical Society. a-f) corner-notched projectile points g) biface fragment h) drill base i-k) corner notched bifaces (dart points?).

a

b

Figure [illegible] profile of Test Unit 3 at 14JF421 showing [illegible] in Ap horizon and lower B horizon.

14JF421

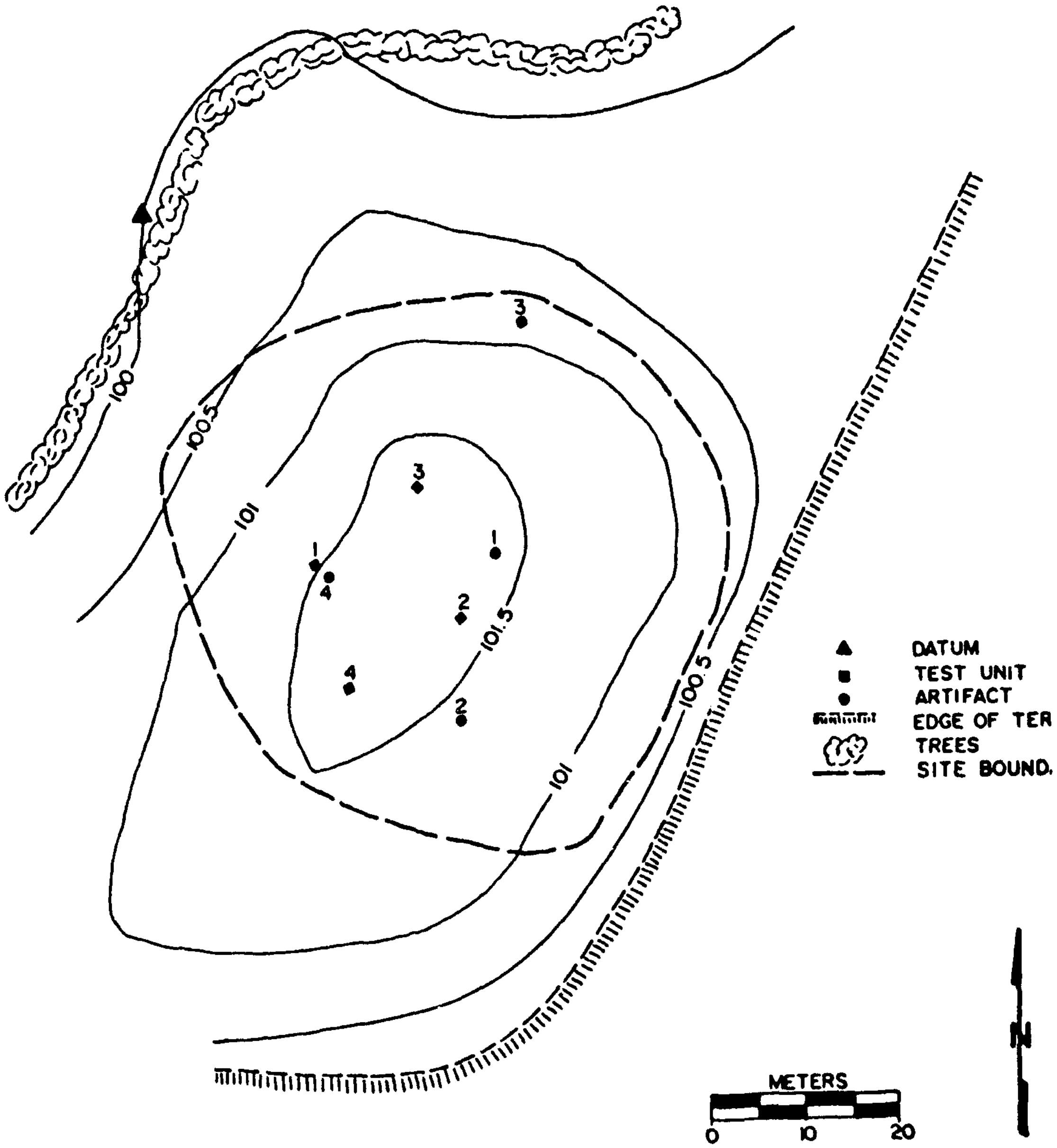


Figure 6.34. Map showing location of surface finds and test units at 14JF421.

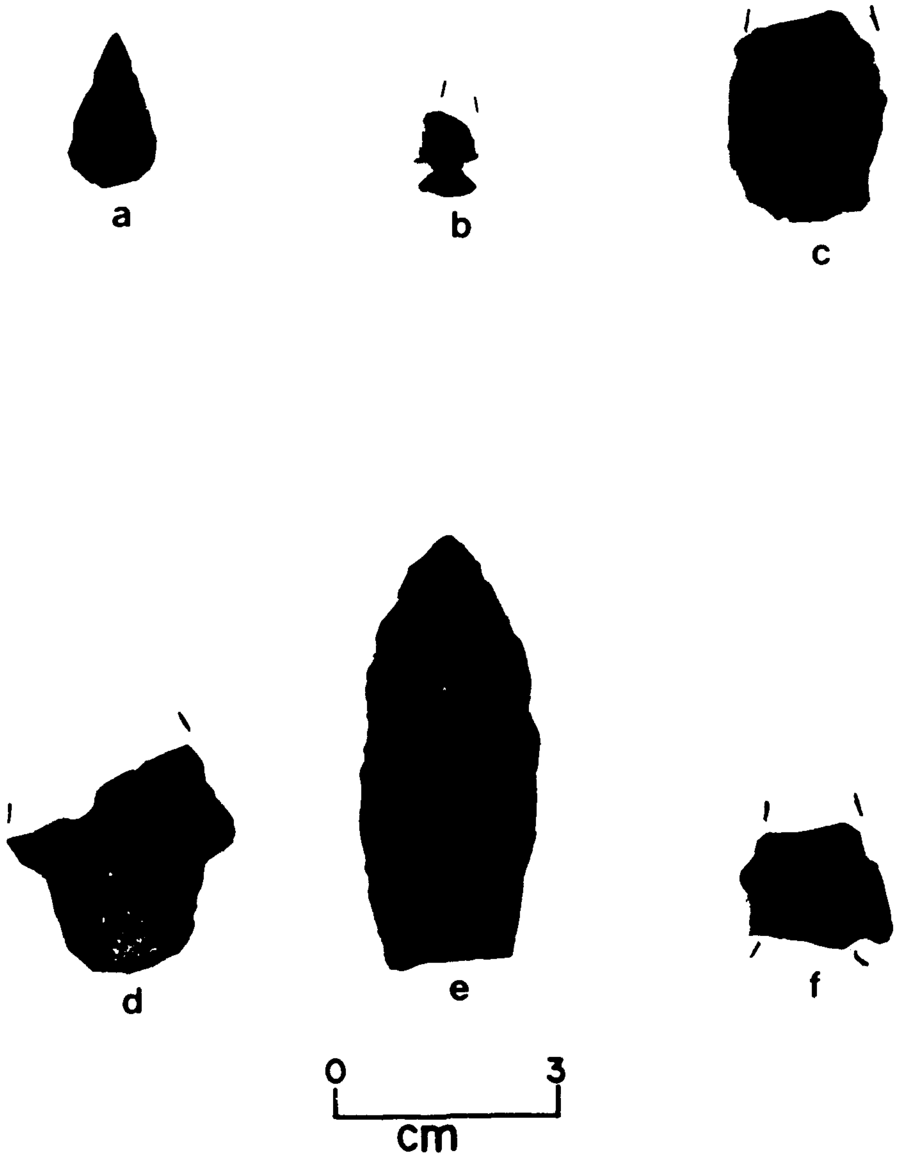


Figure 6.35. Selected artifacts from 14JF421. a) unnotched arrow point, JF421880050 b) Scallorn arrow point, JF421880031 c) biface, JF421880045 d) contracting-stemmed biface, JF421880060 e) lanceolate (Nebo Hill?) biface, JF421880044 f) corner-notched point fragment, JF421880061.

Interpretations

Based upon the data recovered, 14JF421 was occupied during the Nebo Hill phase of the Archaic period, the Plains Woodland period, and during the Pomona variant of the Plains Village period. The 1988 assemblage and that from the previous investigation reflect such activities as lithic tool production and maintenance, hunting, hide processing, and food preparation/storage. While the daub found during the previous investigation suggests long term occupation, this was not substantiated during the present investigation.

Recommendations

Despite the large assemblage collected from this site, no intact cultural deposits were discovered during the present investigation. Although cultural material was found beneath the plow zone in Unit 2, the small sample may have been redeposited downward through rodent activity or the large desiccation cracks noted throughout the excavation. The geomorphic setting is not conducive to the burial of prehistoric ceramic sites and, indeed, the terrace on which the site is located has been subject to severe erosion. Consequently, the deposits have been disturbed by agricultural practices and the integrity of the site has been destroyed. Therefore, the site is not considered eligible for the National Register of Historic Places.

14JF423

Name: Bowies Branch **Recorded:** Reichart 1973
Cultural Affiliation: Plains Village (Central Plains tradition?)
Topographic Setting: T-1 Terrace **Elevation:** 270 m msl
Parent Material: Alluvium **Slope:** 0-2%
Drainage: Bowies Branch **Site Size:** 600 m^2
Ground Cover: Corn **Land Use:** Agriculture
Surface Visibility: 100%
KVE Investigation: October 1-2, 1988

Previous Investigations

This site was recorded by Milton Reichart in 1973 at which time a surface collection was made and a trowel test was excavated. Artifacts recovered from the surface were suggested to be from a Central Plains Tradition occupation and included rim and body sherds (Fig. 6.36a-d; 6.37m), arrow points (Fig. 6.37c-f), an abrader (Fig. 6.37j), end-scraper (Fig. 6.37k), manufacturing debris, and grass impressed daub (Fig. 6.37a-b). Large pieces of daub were also found in the trowel test indicating the remains of a prehistoric structure may be intact beneath the plow zone.

The site was subsequently visited by Iroquois Research Institute in 1977 and by Environmental Systems Analysis in

1985. The former investigation, which occurred when the site area was in corn, consisted of a surface collection which yielded a small amount of prehistoric debris, including ceramics suggested to be of Middle Woodland affiliation (IRI 1977:23). ESA personnel conducted an intensive pedestrian survey and excavated a shovel test near the center of the site. They noted a moderate scatter of prehistoric and historic artifacts (Parisi 1987:155). Surface artifacts included one biface fragment, a modified flake, debitage, and grass impressed daub. The shovel test encountered daub and the edge of a pit or wall trench at 20 cm below the surface and extending beneath the 40 cm limit of excavation (Parisi 1987:156). On the basis of its findings, ESA recommended National Register evaluation of the site (Parisi 1987:156).

Geomorphic Setting

The Bowies Branch site (14JF423) is located on the T-1 terrace in Bowies Branch valley at an elevation of about 270 m msl. The site is on the distal portion of the terrace, near where it contacts the bedrock valley wall. Soil at the site is a variant of the Kennebec silt loam. The 50 cm deep north profile of Test Unit 1 was examined for soil stratigraphy. Table 6.33 provides the resulting description of the soil profile. A silty loam Ap horizon overlies a heavy silt loam AB horizon.

Since the upper 50 cm are rich in daub and contain artifacts, it is presumed the site has undergone gradual aggradation for several hundreds of years. The age of the alluvial fill at the site is unknown. However, based upon surface soil development and geomorphic situation, the fill may contain cultural material to considerable depth, e.g., 2 m.

Table 6.33. Description of Soil Profile in Test Unit 1 at 14JF423

Depth (cm)	Soil Horizon	Description
0-9	Ap1	Dark brown (10YR 3/3) silt loam; weak fine granular structure; friable; slightly acid; abrupt smooth boundary.
9-17	Ap2	Very dark grayish brown (10YR 3/2) silt loam; moderate to weak fine granular structure; friable; slightly acid; gradual smooth boundary.
17-53+	AC	Dark yellowish brown (10YR 3/4) heavy silt loam; moderate fine subangular blocky structure; friable; slightly acid.

1988 Investigations

Investigations at 14JF423 began October 1, and were completed October 2. The site is located on a low terrace north of Bowies Branch. The site had recently been disced and lightly rained upon with consequent 100 percent visibility. The surface was surveyed, artifact concentrations pin-flagged and the areal extent of the site determined through a series of probes taken with an Oakfield coring tool (Fig. 6.38). The site was found to be 20 m north-south and 30 m east-west, covering an area of approximately 600 m^2. Although there was a moderate scatter of lithic debris and daub on the surface, only one artifact, a collared rimsherd (Fig. 6.36f), was mapped.

A datum was established northeast of the site in an area of brush and light timber and three test units established (Fig. 6.38). Unit 1 was located near the boundary of the artifact scatter, Unit 2 was placed near the center of the site, and Unit 3 was placed near a daub cluster where the mapped rim sherd was found. Artifacts were recovered to a depth of 50 cm in Unit 1, and to 40 cm in Units 2 and 3. These artifacts included ceramics, chipped stone tools, lithic manufacturing debris, miscellaneous stone and minerals, and large quantities of daub.

Much of the daub was located beneath the plowzone and was concentrated at 23-30 cm within the undisturbed A and AB horizons (e.g. Fig. 6.39). This indicates that while the upper 10 or 20 cm may have been disturbed by agriculture, there is an intact AB soil horizon which, based upon this and previous investigations, contains undisturbed cultural material.

Assemblage

The artifact assemblage from this site consists of 50 ceramic body sherds and two rim sherds, four projectile points and point fragments, one biface, one scraper, four utilized flakes, 262 pieces of debitage and 7,055 grams of daub (Table 6.34). The two rims (Fig. 6.36e-f) and the nine analyzed body sherds indicate a Plains Village (Central Plains Tradition and/or Pomona variant) affiliation. This is substantiated by the presence of four small triangular projectile points (Fig. 6.37g-i, 1).

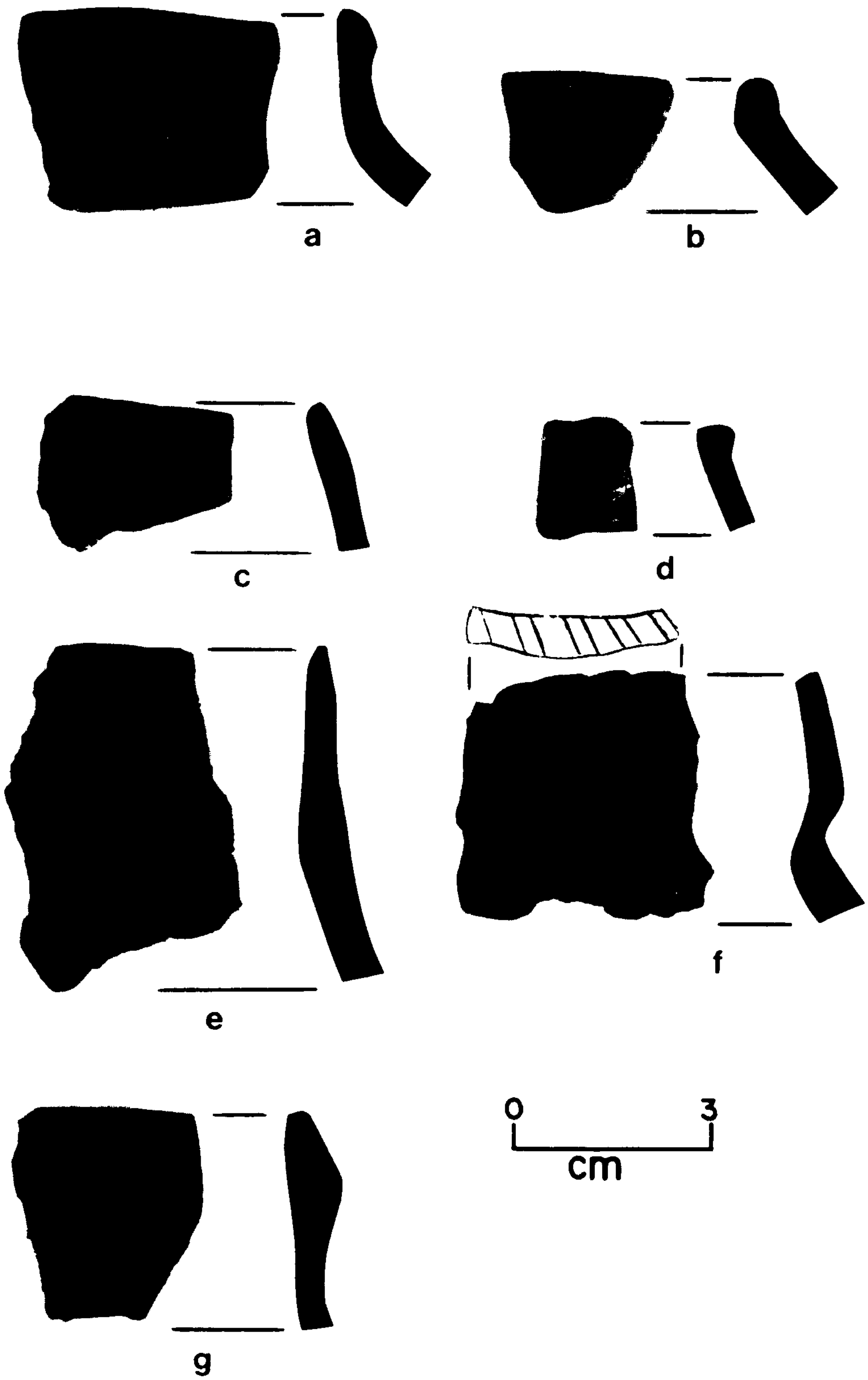


Figure 6.36. Selected artifacts from 14JF423 and 14JF463. a) collared rim sherd b) cord-marked rim sherd c) incised rim sherd d) rim sherd (a-d: Reichart collection, KSHS) e) straight rim sherd, JF4230074 f) collared rim with incised lip, JF423880080 g) collared rim, JF463880001.

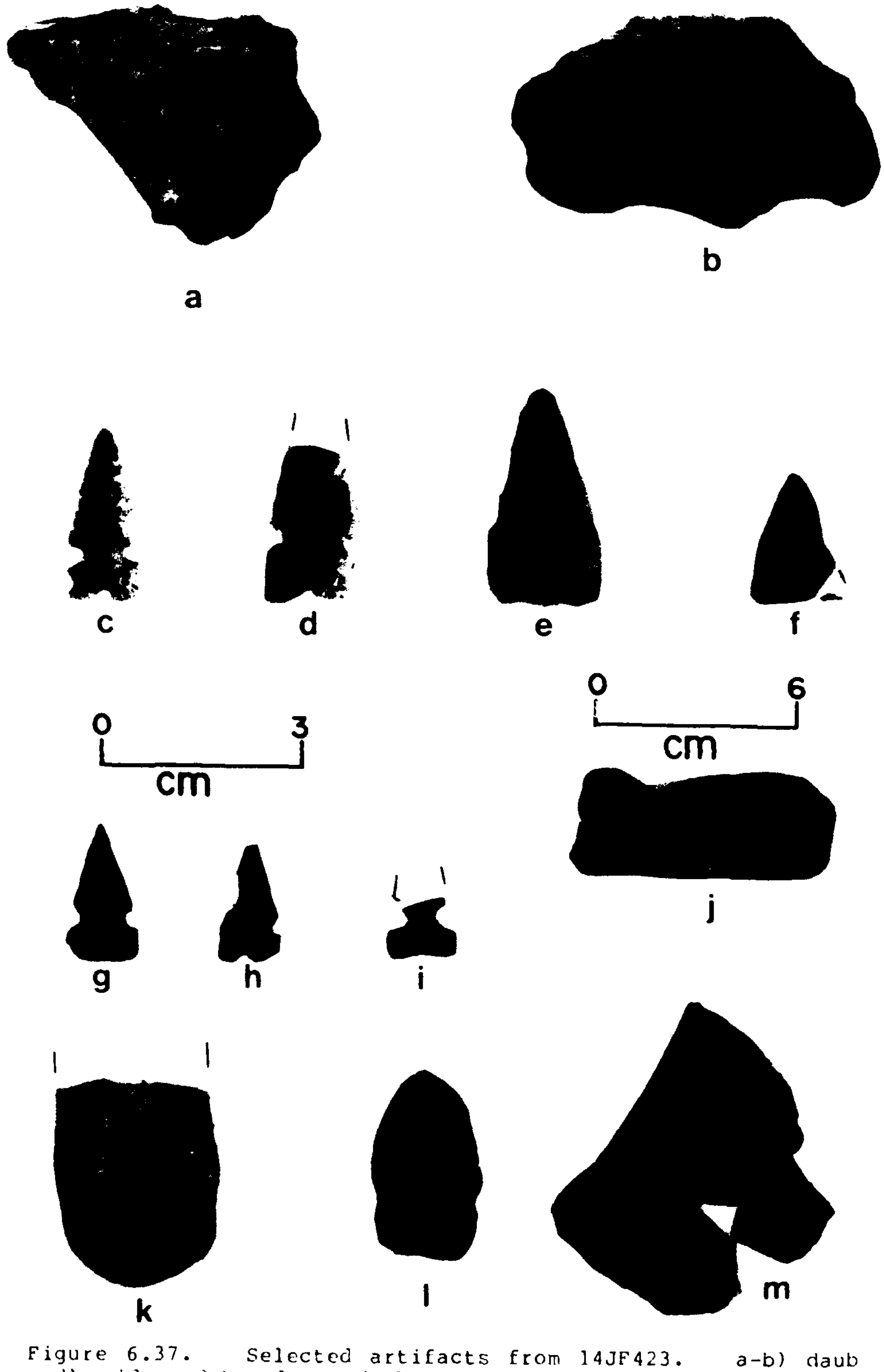


Figure 6.37. Selected artifacts from 14JF423. a-b) daub c-d) side-and-basal notched arrow points e-f) unnotched arrow points g,i) side-notched arrow points (JF423880016, 0050, 0067) j) shaft abrader k) end scraper l) unnotched biface (point pre-form?) JF423880041 m) cord-marked body sherd. (a-f, j-k, m: Reichart collection, KSHS). Artifacts a-b, j and m to 6 cm scale.

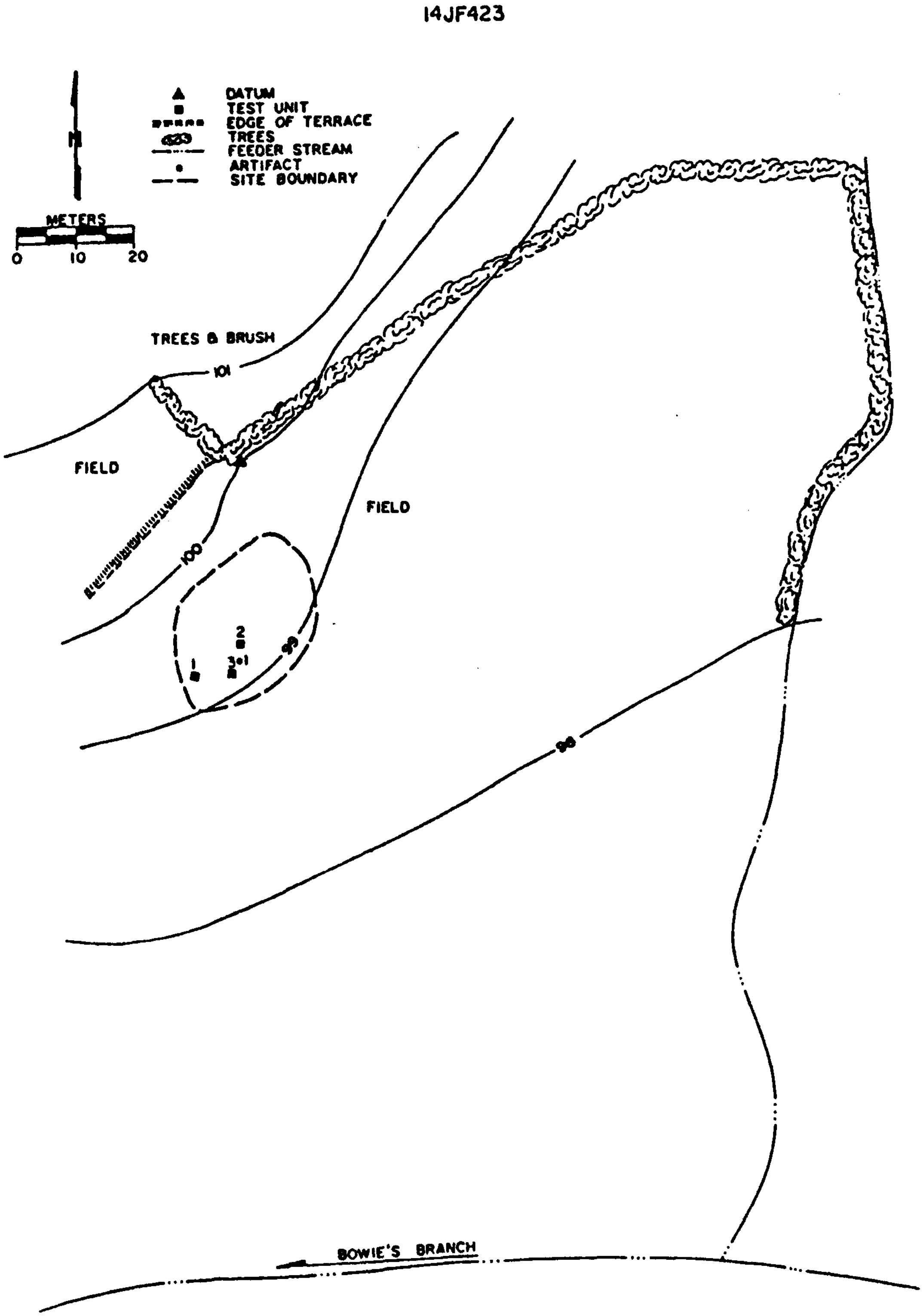


Figure 6.38. Map showing location of surface find and test units at 14JF423.

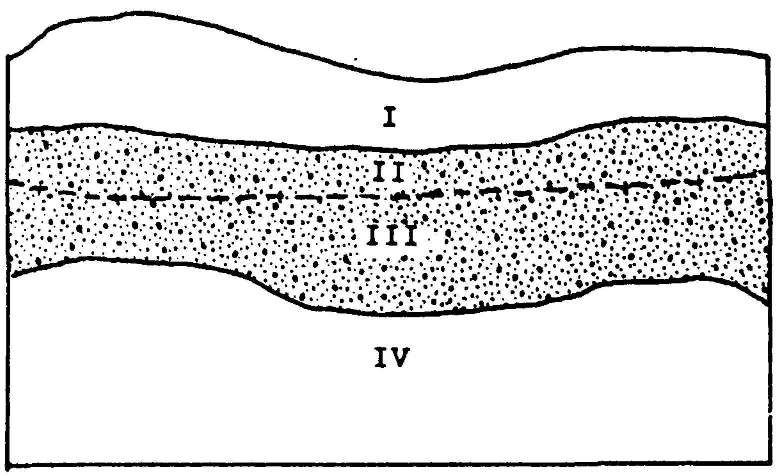
14JF423

TEST UNIT 1

NORTH WALL PROFILE

10cm

CONCENTRATION OF DAUB



I. AP 1

II. AP 2

III. UNDISTURBED AC HORIZON

IV. AC HORIZON

Figure 6.39. Profile of test unit 1 at 14JF423 showing relationship of daub concentration to old and recent plowzones.

Table 6.34 Cultural Material from Units 1-3 at 14JF423.

Test Unit	xu1	xu1	xu1	xu1	xu1	xu2
Level	1	2	3	4	5*	1
(cm)	0-10	10-20	20-30	30-40	40-50	0-10
Body Sherds	9	1	1	--	--	8
Potlids	--	1	--	--	--	--
Shatter	3	6	1	--	--	7
Flakes	17	11	7	3	1	22
Ret/Ut.Flakes	1	--	--	--	--	--
Proj. Pts.	--	--	1	--	--	1
Scraper	--	--	1	--	--	--
Daub (grams)	647	253	1083	86	16	459

* one-half level excavated

Table 6.34 (cont.)

Test Unit	xu2	xu2	xu2	xu3	xu3	xu3	xu3
Level	2	3	4*	1	2	3	4*
(cm)	10-20	20-30	30-40	0-10	10-20	20-30	30-40
Body Sherds	3	5	--	11	8	8	1
Rim Sherds	--	--	--	--	--	--	1
Potlids	--	--	--	--	1	--	--
Shatter	2	1	--	6	11	6	1
Flakes	39	11	--	29	53	20	2
Tested Matl.	--	--	--	--	1	--	--
Ret./Ut. Flake	--	--	--	1	2	--	--
Proj. Pt.	--	--	--	1	--	1	--
Biface Frag.	--	1	--	--	--	--	--
Daub (Gra s)	432	231	3	1032	1576	1056	181

*one-half level excavated

Interpretation

The artifact assemblage indicates that 14JF423 is a Plains Village occupational site. The mixture of ceramics with Central Plains tradition and Pomona attributes makes more specific identification of the site's occupants tenuous at this time. The presence of large quantities of daub below the plow zone further suggests a structure was present and that sub-surface features such as postholes, storage pits, and hearths may be present. Activities inferred from the assemblage indicate hunting, tool production and maintenance, hide preparation, and food storage or cooking.

Recommendations

Although plowing has disturbed the upper portions of the A horizon, significant quantities of daub and artifacts are present beneath the plowzone. If the base of the daub concentration represents a floor, then significant information may be preserved. Moreover, sub-floor features such as storage pits and post molds have probably been spared agricultural disturbance. On the basis of these findings, it is suggested that the site retains significant research potential and it is recommended that 14JF423 be considered for placement on the National Register. A more detailed discussion of potential research goals for any future investigation of this site is presented in chapter 10.

14JF447

Name: Unnamed **Recorded:** Reichart 1974
Cultural Affiliation: Late Archaic; Plains Woodland
Topographic Setting: Foot Slope **Elevation:** 270-276 m msl
Parent Material: Loess/limestone **Slope:** 3-7%
Drainage: Delaware River **Site Size:** 3500 m^2
Ground Cover: Soybeans **Land Use:** Agriculture
Surface Visibility: 60-100%
KVE Investigation: August 14-15, 1988

Previous Investigations

Milton Reichart recorded this site following a survey in 1974, at which time he noted four distinct areas of artifact concentration. Area A is situated on the edge of the hillslope and toeslope at the northeast edge of the site and Area B is at the interface of the toeslope and adjacent terrace about 100 feet to the east. Area C is off the southern edge of the site area and represents the remains of an historic farmstead. Area D is a findspot where the base of a lanceolate biface was recovered. Artifacts found in Areas A and B, which Reichart recommended for testing, included "arrow points, a few potsherds, flint flakes, mullers, blade sections, one iron fish hook presumed to be of European ownership, and a fragment of clam shell" (Kansas Archeological Site Survey Form). Other material observed at the site consisted of burned and unburned limestone, debitage, and historic debris. Representative artifacts in the Reichart collection at the Kansas State Historical Society are shown in Figure 6.40.

Geomorphic Setting

The unnamed site 14JF447 is located on the right bank of the Delaware River at an elevation of about 270-276 m msl. According to the Jefferson County soil survey (Dickey <u>et al</u>. 1977), the upland soil present is the Gymer silt loam and the alluvial soil, the Kennebec silt loam. The Gymer silt loam

is a moderately sloping soil formed on lower side slopes and foot slopes in silty parent material. The Kennebec silt loam, as noted elsewhere, is formed in silty alluvium on low terraces and floodplains along the Delaware River and major tributaries. It appears that the Kennebec silt loam occurs immediately east and southeast of the site boundary.

Severe erosion has occurred on the Gymer soil at the western-most end of the site. Test Unit 1 encountered bedrock at a depth of only 20 cm; the Ap horizon was resting directly upon the bedrock, or R layer. As evidenced by the contours on the site map (Fig. 6.41), most of the eroded soil material has washed off this high point down to the south-southeast. Test Unit 3 indicates only moderate erosion. The Ap horizon rests upon the Bt horizon, i.e., the BA horizon has been stripped and converted to Ap. Test Units 2 and 4 both exposed an Ap or B horizon. The latter unit was sampled in each of the two horizons. The soil description and sample analyses are presented in Tables 6.35 and 6.36, respectively. The silty loam, very dark brown Ap horizon overlies the bright silt loam BA horizon. Although similar texturally (slight increase in clay for BA), they differ notably in pH and color. Attributes of the soil in Test Unit 4 indicate it is the Gymer silt loam, a Typic Argiudoll rather than the Kennebec silt loam, a Cumulic Hapludoll.

The topographic setting of the site afforded an elevated, near channel location. Geomorphically, it appears this would have been the situation for the last several thousand years.

Table 6.35. Description of Soil Profile in Test Unit 4 at 14JF447

Depth (cm)	Soil Horizon	Description
0-15	Ap	Very dark brown (10YR 2/2) silt loam; moderate fine granular structure; friable; medium acid; abrupt smooth boundary.
15-25+	BA	Dark brown (7.5YR 3/4) silt loam; moderate fine subangular blocky structure; friable; slightly acid.

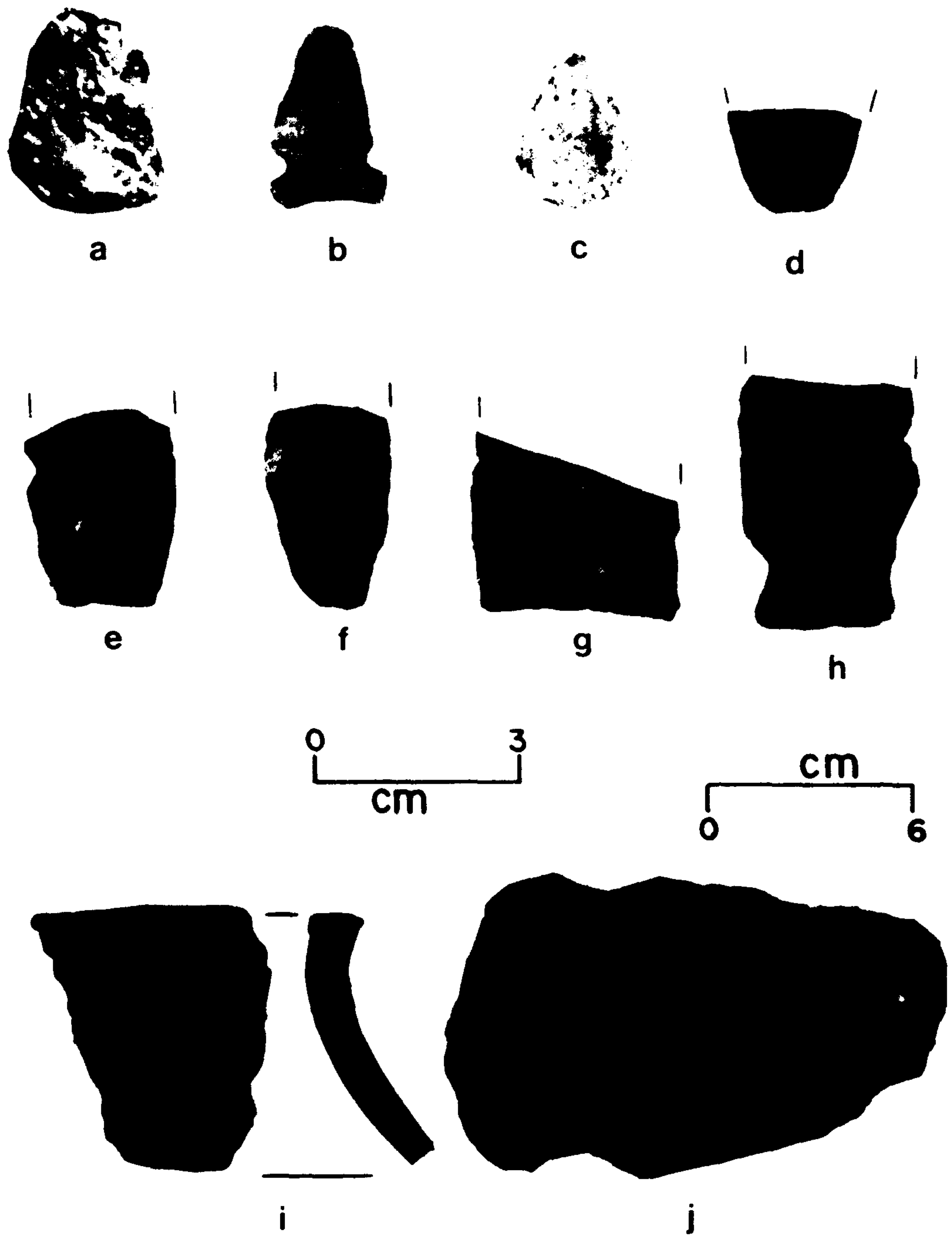


Figure 6.40. Selected artifacts from 14JF447. a) end scraper b) side-notched projectile point, JF447880060 c) notched point d-f) lanceolate biface fragments (l-r: JF447880065, 0046, 0061) g) biface base, JF447880062 h) expanding-stemmed biface, JF447880050 i) flat-lipped rim sherd, JF447880011 j) grooved axe or hoe, JF447880052. (a, c: Reichart collection, KSHS). Artifact j is to 6 cm scale.

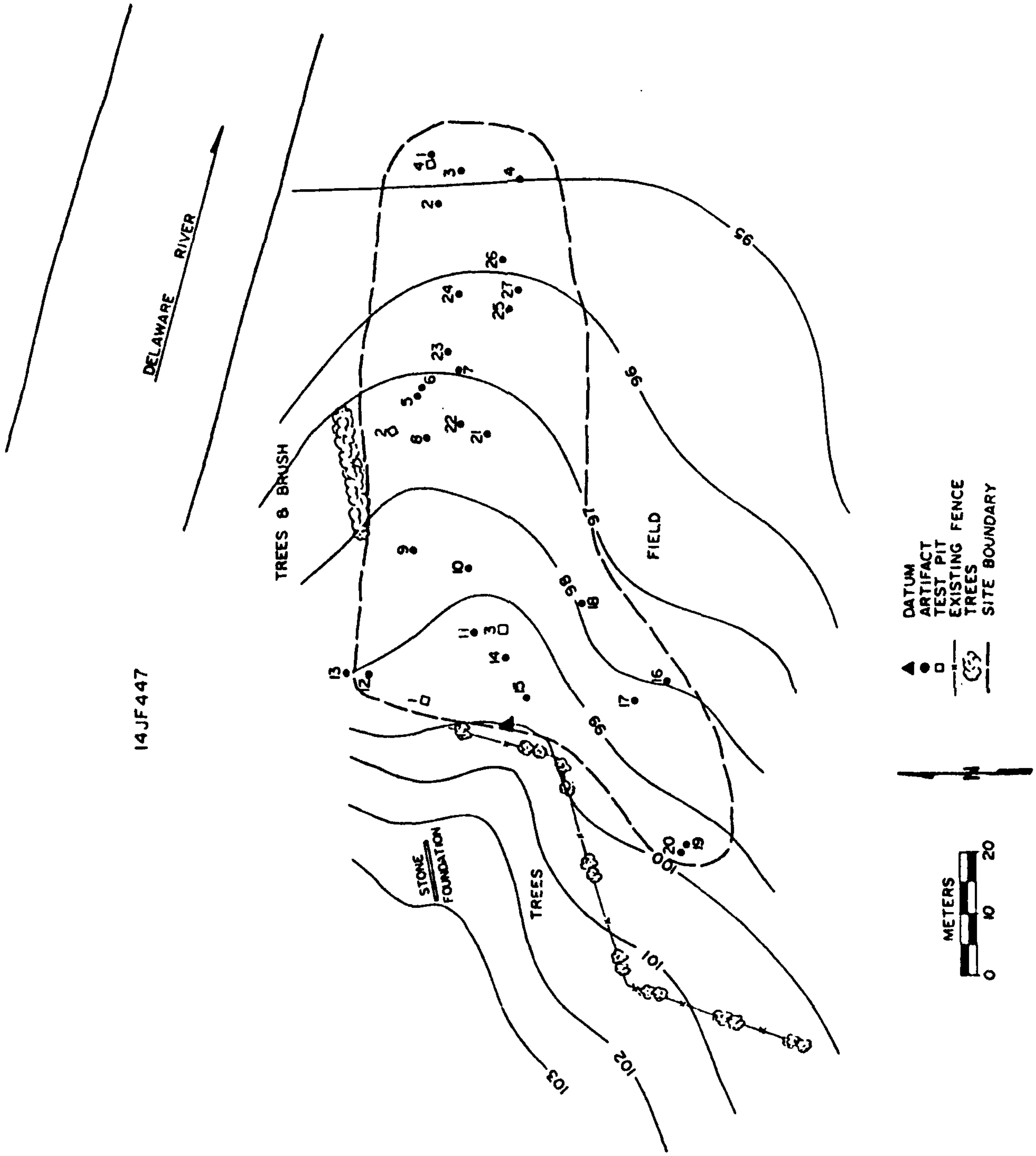


Figure 6.41. Map showing location of surface finds and test units at 14JF447.

Table 6.36. Chemical and Physical Sediment Data from Test Unit 4 at 14JF447.

Sample No.	Depth (cm)	Soil Horizon	Particle-size (%) Sand	Silt	Clay	Color (Munsell-moist)	LOI (%)	pH
1	5-10	Ap	24	70	6	10YR 2/2	4.20	6.90
2	18-22	BA	24	60	16	7.5YR 3/4	4.29	5.78

1988 Investigations

This site was investigated August 14 and 15, at which time the site was planted in maturing soybeans which limited the visible surface area to 60 percent with 100 percent visibility between the rows. The site is located upon the lower portion of a hill slope and alluvial terrace immediately south of the Delaware River. The site was surveyed and artifacts, artifact concentrations, and the site boundaries were pin-flagged (Fig. 6.41). The site measures 35 m north-south and 100 m east-west. Artifact density was higher on the upper eroded slope in areas where at least some of the Ap soil horizon was still present, and was lower in the area of exposed Bt horizon and the lower alluvial terrace. Artifacts collected from the surface include ceramics, groundstone and chipped stone tools, and historic artifacts (Table 6.37).

Table 6.37 Surface Artifacts from 14JF447 shown on Figure 6.41.

Artifact 1	Body Sherd
Artifact 2	Body Sherd
Artifact 3	Biface Fragment
Artifact 4	Biface Fragment
Artifact 5	Scraper
Artifact 6	Biface Fragment
Artifact 7	Biface Fragment (Fig. 6.40e)
Artifact 8	Hammerstone
Artifact 9	Modified Flake
Artifact 10	Biface Fragment
Artifact 11	Expanding-Stemmed Biface (Fig. 6.40h)
Artifact 12	Hammerstone
Artifact 13	Hafted Hoe? (Fig. 6.40j)
Artifact 14	Modified Flake
Artifact 15	Historic Ceramics
Artifact 16	Historic Ceramics
Artifact 17	Preform
Artifact 18	Modified Flake
Artifact 19	Scraper
Artifact 20	Biface Fragment
Artifact 21	Side-Notched Projectile Point (Fig. 6.40b)
Artifact 22	Biface Fragment (Fig. 6.40f)
Artifact 23	Biface Fragment (Fig. 6.40g)
Artifact 24	Biface Fragment
Artifact 25	Biface Fragment
Artifact 26	Biface Fragment (Fig. 6.40d)
Artifact 27	Biface Fragment

A datum was established and four test units were placed in areas of artifact concentrations and the various topographic features at the site (Fig. 6.41). Artifacts were confined to the upper 20 cm in all units with the exception of those artifacts found within large desiccation cracks present in some of the test units. Bedrock was encountered at a depth of 10 cm in Unit 1 while other units excavated on the slope also contained shallow deposits. Also noted was the lack of stratigraphic integrity of prehistoric and historic debris, which was recovered in all levels of each test unit. No undisturbed cultural deposits were located in the excavations.

Assemblage

The artifact assemblage from 14JF447 consists of three rim sherds and 20 body sherds, 10 projectile points and point fragments, five bifaces and biface fragments, two hammerstones, one grooved groundstone axe or hoe, seven retouched flakes, and 120 pieces of lithic manufacturing debris (Table 6.38).

Table 6.38 Cultural Material from Units 1-4 at 14JF447.

Test Unit	xu1	xu1	xu2	xu2
Level	1	2	1	2*
(cm)	0-10	10-20	0-10	10-30
Body Sherds	--	--	10	7
Rim Sherds	--	--	--	1
Potlids	--	--	--	1
Shatter	--	--	--	7
Flakes	5	--	13	49
Tested Matl.	--	--	--	1
Ret./Ut. Flake	--	--	--	1

* levels inadvertantly combined.

Table 6.38 (cont.)

Test Unit	xu3	xu3	xu4	xu4	xu4	xu4
Level	1	2	1	2	3	4*
(cm)	0-10	10-20	0-10	10-20	20-30	30-40
Body Sherds	--	--	4	--	--	--
Shatter	--	1	1	--	--	--
Flakes	10	5	25	--	--	--
Tested Matl.	2	--	--	--	--	--
Ret./Ut. Flake	--	--	1	--	--	--

* one-half level excavated

Of the 23 ceramic artifacts only one rim (Fig. 6.40i) and seven body sherds were large enough for analysis and these indicate a Grasshopper Falls phase occupation (see chapter 8). The projectile points are all surface finds reminiscent of an Archaic tool tradition. They include two side notched points (Fig. 6.40b-c) and four lanceolate point fragments of the Nebo Hill phase (e.g., Fig. 6.40d-f). One biface with an expanding stem may belong to either the Archaic or Plains Woodland occupations (Fig. 6.40h). The three remaining points are fragments too small for typological identification. The quartzite axe or hoe, also found on the surface, is grooved on three sides and is not temporally diagnostic.

Interpretation

That the hillslope at the site has suffered extensive erosion is evident in the units excavated in that area. These units lacked any A or Ap soil horizon. The artifact assemblage from 14JF447 represents a multi-component Archaic and Plains Woodland site. The Archaic artifacts obtained reflect a hunting camp. The Plains Woodland ceramics indicate food storage/preparation. The low incidence of tools, and lack of variation in the artifacts for the Plains Woodland component indicates a short term occupation.

Recommendations

14JF447 has been subject to severe erosion through slope wash. The soils of the higher portion of the site area are residual and shallow, precluding any possibility of deeply buried components. The lower portion of the site also contained shallow deposits. For these reasons, the site is considered ineligible for the National Register.

14JF448/449

Name: Reichart **Recorded:** Reichart 1974
Cultural Affiliation: Plains Woodland (Grasshopper Falls phase)
Topographic Setting: Upland Ridge Nose
Parent Material: Shale/limestone **Elevation:** 273 m msl
Drainage: Delaware River **Slope:** 3%
Ground Cover: Timber **Site Size:** ca. 1,100 m^2
Land Use: Wildlife **Surface Visibility:** 0%
KVE Investigation: August 15-16, 20-21, 1988

Previous Investigations

14JF448 and 14JF449 were recorded by Milton Reichart in 1974. They consist of two low earthen mounds approximately 26 m apart. 14JF448 was recorded as a low (ca. 60 cm high) but distinct, large mound (9 x 11 m) in a wooded area near a steep bank on the western edge of Perry Lake. 14JF449 is located on the same terrain southwest of the former mound and is described as 18 ft (5.5 m) in diameter. Reichart excavated one trowel test (12" by 16" to a depth of 16") in each of the mounds and recovered ceramic body sherds, one projectile point, debitage, burned limestone and quartzite, burned earth and daub (Kansas Archaeological Site Survey Forms). Due to the short distance between the mounds and their comparable content and cultural affiliation, the two mounds were excavated simultaneously and will be jointly referred to in this report as the Reichart site.

Geomorphic Setting

The Reichart site, 14JF448/449, is located at about 273 m msl on a bedrock upland overlooking the Delaware River valley. Soil mapped at the site is the Vinland-Rock outcrop complex which develops in side slopes on uplands. Consequently, it consists of shallow soils intermingled with deeper soils and rock outcrop, usually limestone or sandstone. Since the site is high on the slope above the major break, or increase, in slope, the soil is relatively deep and erosion has been limited. An acceleration in erosion has also been avoided since the site lies within a wooded area and has not been cultivated.

Soil stratigraphy at the site was examined through the three test units and three 7.6 cm-diameter cores taken with the Giddings soil probe. Because the two mounds comprising the site consist primarily of midden material, soil samples were collected and analyzed. The four samples were collected from Test Unit 2, 14JF448, the eastern-most mound. The results are presented in Table 6.39. The silt loam texture varies little throughout, as does the color (black to very dark brown) and pH. Organic carbon content diminishes with depth as would be expected, but remains relatively high due to the anthropomorphic nature of the soil.

Core 2, extracted from 14JF449, provides a representative profile for the soil developed within the two mounds. The description is presented in Table 6.40. Cultural material extends to a depth of about 80 cm, immediately above the abrupt textural change.

The location of the site seems ideal: good visibility, water availability, and the food resources of the uplands. Further, the land surface probably remained stable for an extended period of time, i.e., it is well above any flood threat and on a sufficiently low slope surface as to receive very little colluvium from upslope and experience little erosion.

Table 6.39. Chemical and Physical Sediment Data from Test Unit 2 at 14JF448.

Sample No.	Depth (cm)	Soil Horizon	Particle-size (%) Sand	Silt	Clay	Color (Munsell-moist)	LOI (%)	pH
4	5-10	A	34	60	6	10YR 2/1	6.38	6.98
3	20-25	AB1	30	62	8	10YR 2/2	4.18	7.11
2	35-40	AB2	30	61	9	10YR 2/2	3.32	7.09
1	50-55	AB2	36	62	2	10YR 2/2	3.29	6.92

Table 6.40. Description of Soil Profile from Core 2 at 14JF449.

Depth (cm)	Soil Horizon	Description
0-7	A	Black (10YR 2/1) silt loam; moderate fine granular structure; friable; slightly acid; gradual smooth boundary.
7-18	AB1	Very dark grayish brown (10YR 3/2) silt loam; fine subangular blocky structure; friable; slightly acid; gradual smooth boundary.
18-35	AB2	Dark brown (10YR 3/3) silt loam; medium subangular blocky structure; friable; slightly acid; gradual smooth boundary.
35-56	AB3	Very dark gray (10YR 3/1) silt loam; strong medium subangular blocky structure; friable; neutral; gradual smooth boundary.
56-70	AB4	Dark brown (10YR 3/3) silt loam; strong medium subangular blocky structure; friable; firm; neutral; gradual smooth boundary.
70-83	BA	Dark yellowish brown (10YR 3/4) silt loam; strong medium subangular blocky structure; friable; faint mottling (7.5YR 5/6); neutral; abrupt smooth boundary.
83-150	2Bw	Strong brown (7.5YR 4/6) clay loam; moderate larger subangular blocky structure; slightly acid; firm; gradual smooth boundary.
150-170+	2BC	Yellowish brown (10YR 5/8) clay loam; moderate large subangular blocky structure; slightly acid; firm.

1988 Investigations

Both mounds were investigated August 15, 16, 20, and 21. They are located on the nose of an upland ridge on the west bank of Perry Lake. The site was overgrown with dense brush and timber upon initial inspection and required intensive clearing of brush and light timber. A datum was established between the two mounds and three test units were defined, two on mound 14JF448 and the third on 14JF449. Subsequent to these investigations, three cores were extracted with a Giddings mobile earth drill to evaluate the deposits and to check for deeply buried cultural components (Figure 6.42).

Artifacts were found throughout all levels of the excavation units and consist of ceramics, chipped stone, lithic manufacturing debris, limestone, quartzite, and daub. Daub was notably more abundant in Units 1 and 2 at Mound 14JF448 (Table 6.41).

Mound 14JF448 (Fig. 6.43) consisted of a cultural mix from the surface to a depth of 56 cm where a 20 cm (55-75 cm) zone of dense daub was encountered (Figs. 6.44-45). A core extracted from the unexcavated area between Units 1 and 2 revealed that this was followed by a zone, which varied in thickness from 20 to 25 cm (75-95 or 100 cm in depth), that contained diffuse fragments of daub, burned earth, and charcoal. It was underlain by a yellowish-brown sterile B horizon. Mound 14JF449 exhibited a similar cultural mix to a depth of 55 to 60 cm (Fig. 6.43), below which depths sterile B horizons were encountered in two soil cores. The upper levels of both mounds revealed some rodent activity and tree root disturbance (e.g., Fig. 6.43).

One feature was located in Unit 2, Mound 14JF448 at a depth of 56 cm (Fig. 6.44). It consisted of a darker soil than its surrounding matrix and contained a daub concentration with larger fragments than the surrounding area. It extended to a depth of 66 cm and appeared as a small pit or disconformity 30 cm in diameter. The presence of Feature 1 and the large sample of daub collected from Units 1 and 2 suggest that 14JF448 was the location of a habitation structure.

Assemblage

The artifact assemblage from 14JF448/449 is large and varied. From two test units in 14JF448 fourteen rim sherds and 323 body sherds, 455 lithic artifacts including three projectile points, five retouched flakes, seventeen cores and one hammerstone were recovered. Also obtained were samples of plant and animal remains, daub/burned earth, burned limestone, sandstone, and fire-cracked quartzite (Table 6.41). The ceramics (e.g., Figs. 6.46, 6.47a, c-d; see also chapter 8), as well as the projectile points (e.g., Fig. 6.47e) indicate a Plains Woodland, Grasshopper Falls phase occupation.

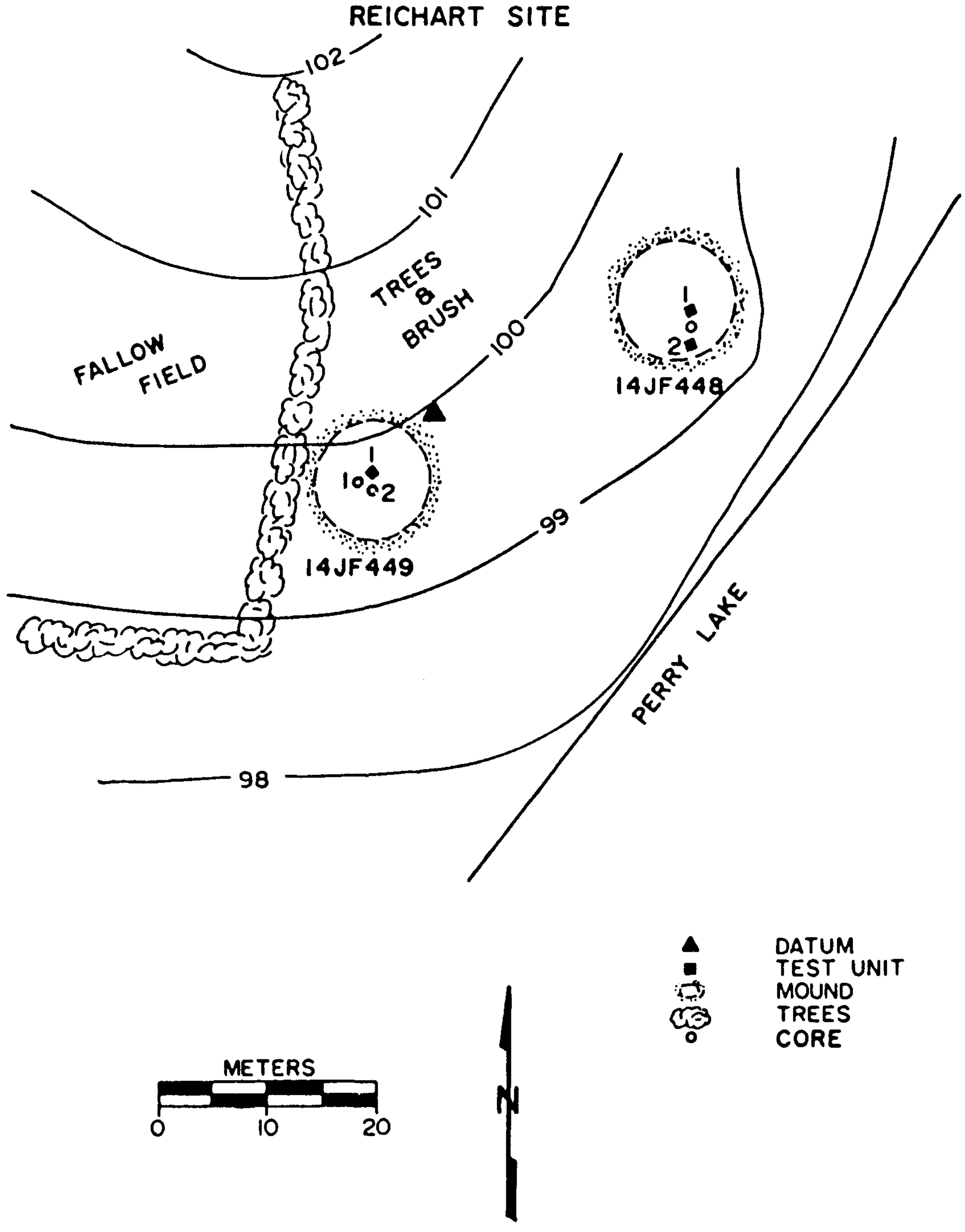
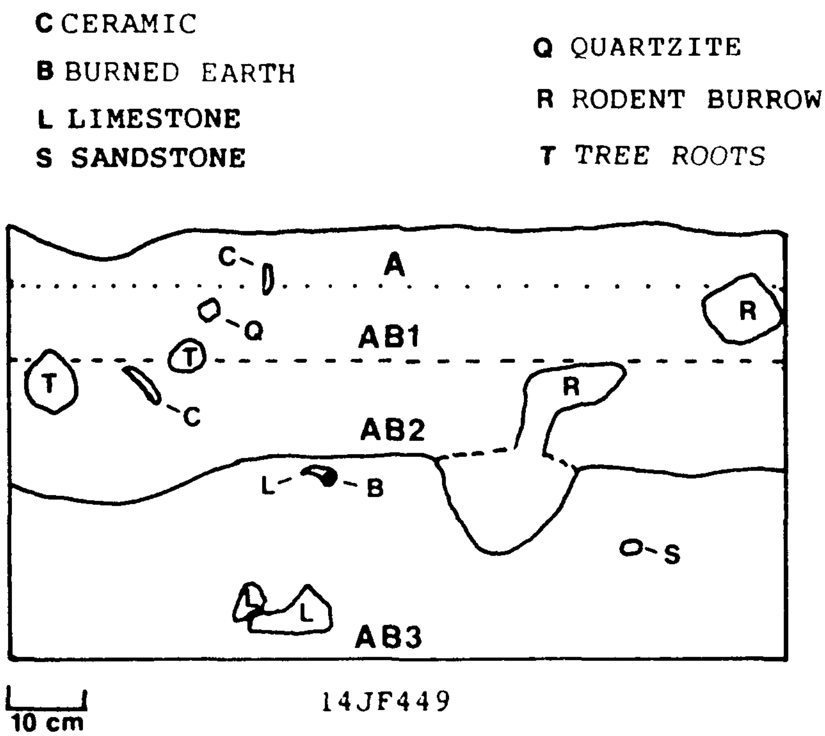


Figure 6.42. Map showing location of Mounds 14JF448 and 14JF449, test units and Giddings cores at the Reichart site.



14JF449

TEST UNIT 1

WEST WALL PROFILE

Figure 6.43. above) Photograph taken by Reichart of Mound 14JF448 looking east from the adjacent field during autumn. below) Profile of Test Unit 1 at Mound 14JF449 showing soil horizons, distribution of cultural material and evidence of natural disturbances.

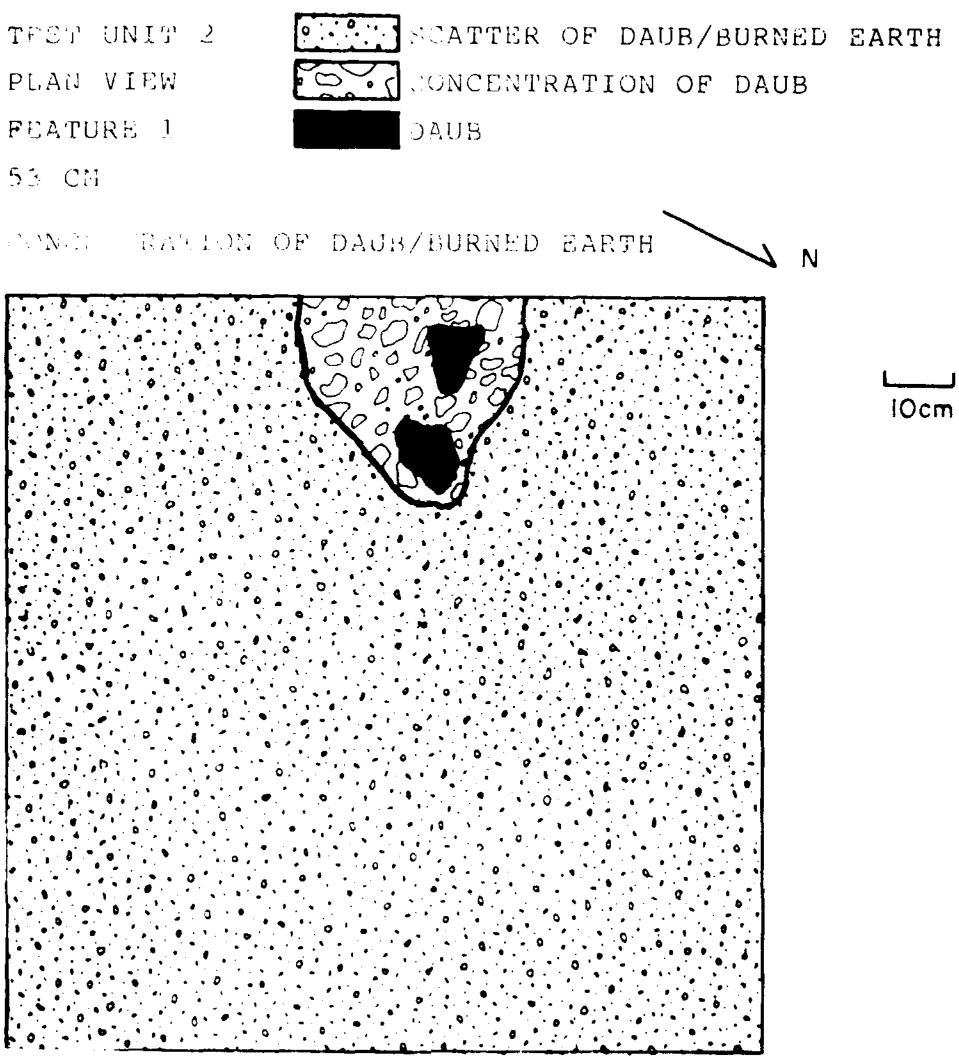
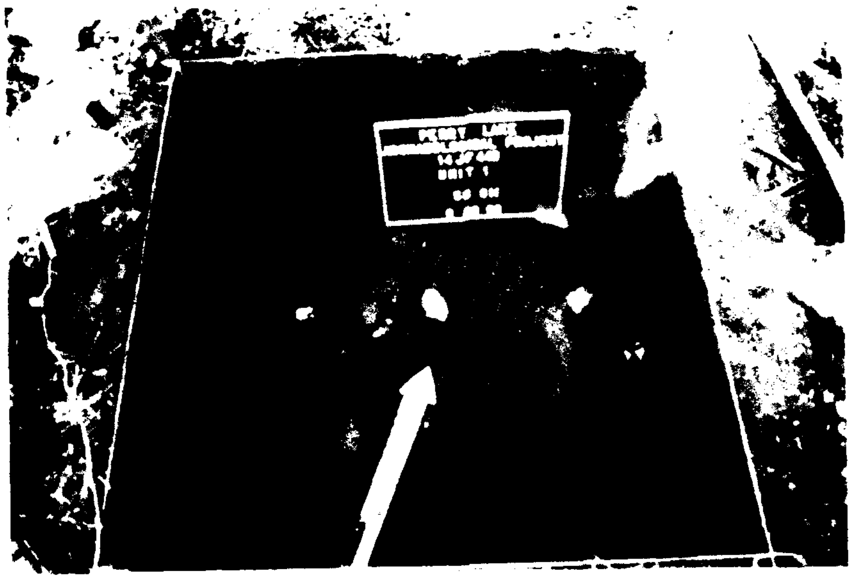


Figure 6.44. Photograph and drawing of Feature 1 (daub concentration) in Test Unit 2, 53 cm, at Mound 14JF448.



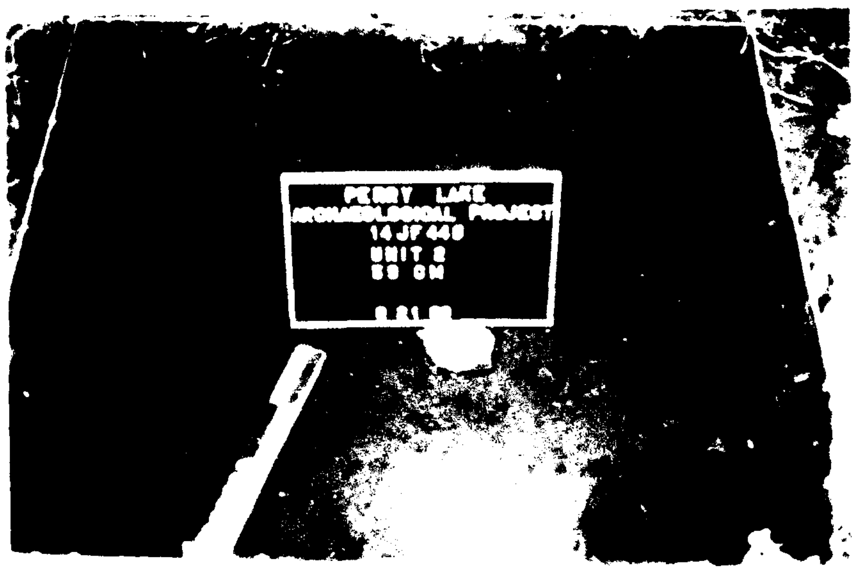


Figure 6.45. above) Photograph of Unit 1, 50 cm, at Mound 14JF448 showing distribution of burned limestone, fire-cracked quartzite, ceramic sherds. below) Photograph of Unit 2, 59 cm, at Mound 14JF448 showing excavated Feature 1 (lower right), limestone, quartzite, ceramic, and scattered daub.

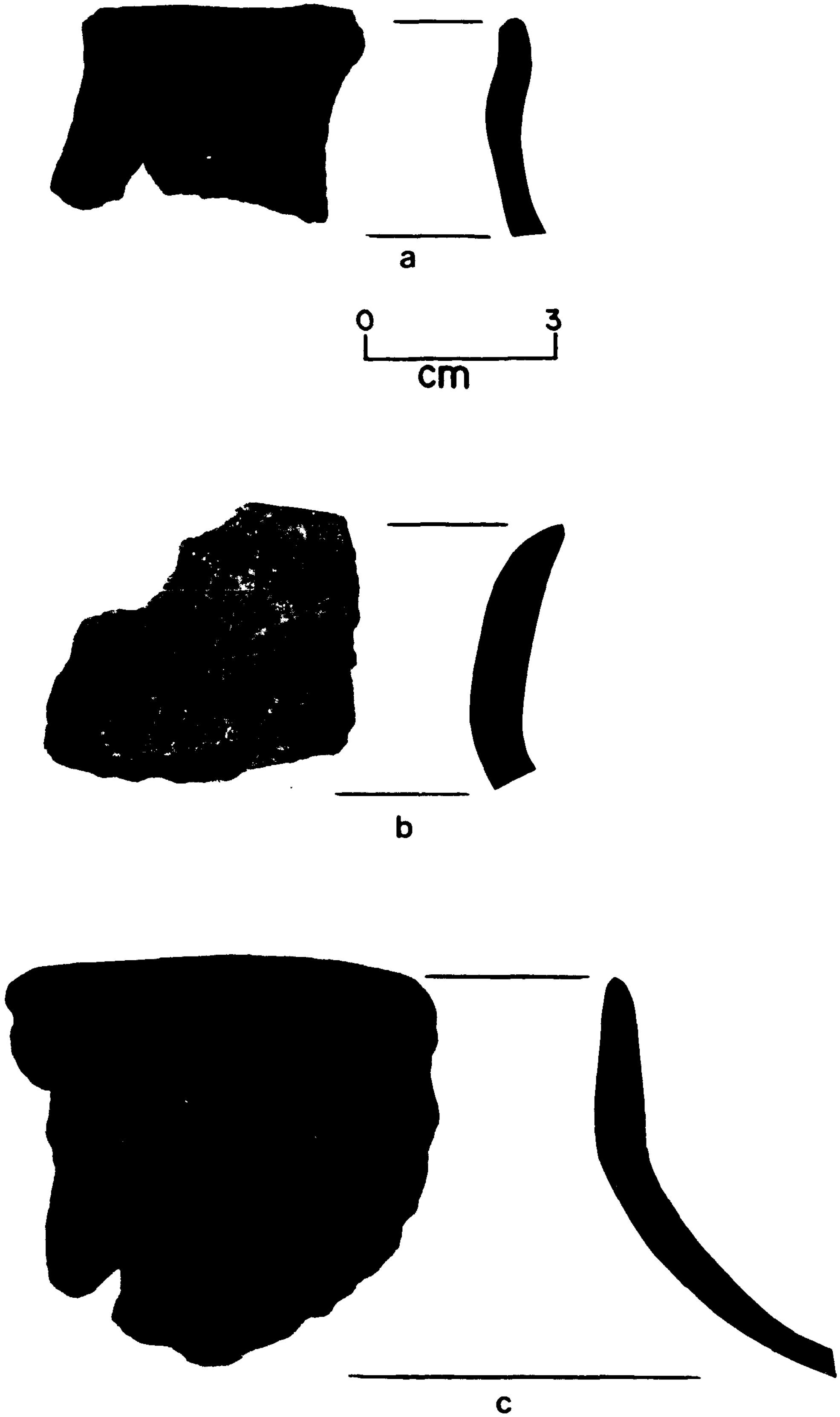


Figure 6.46. Selected rim sherds from Mound 14JF448. a) smoothed exterior, JF448880040a b) partially smoothed-over exterior, JF448880040b c) straight with flared shoulder, JF448880066.

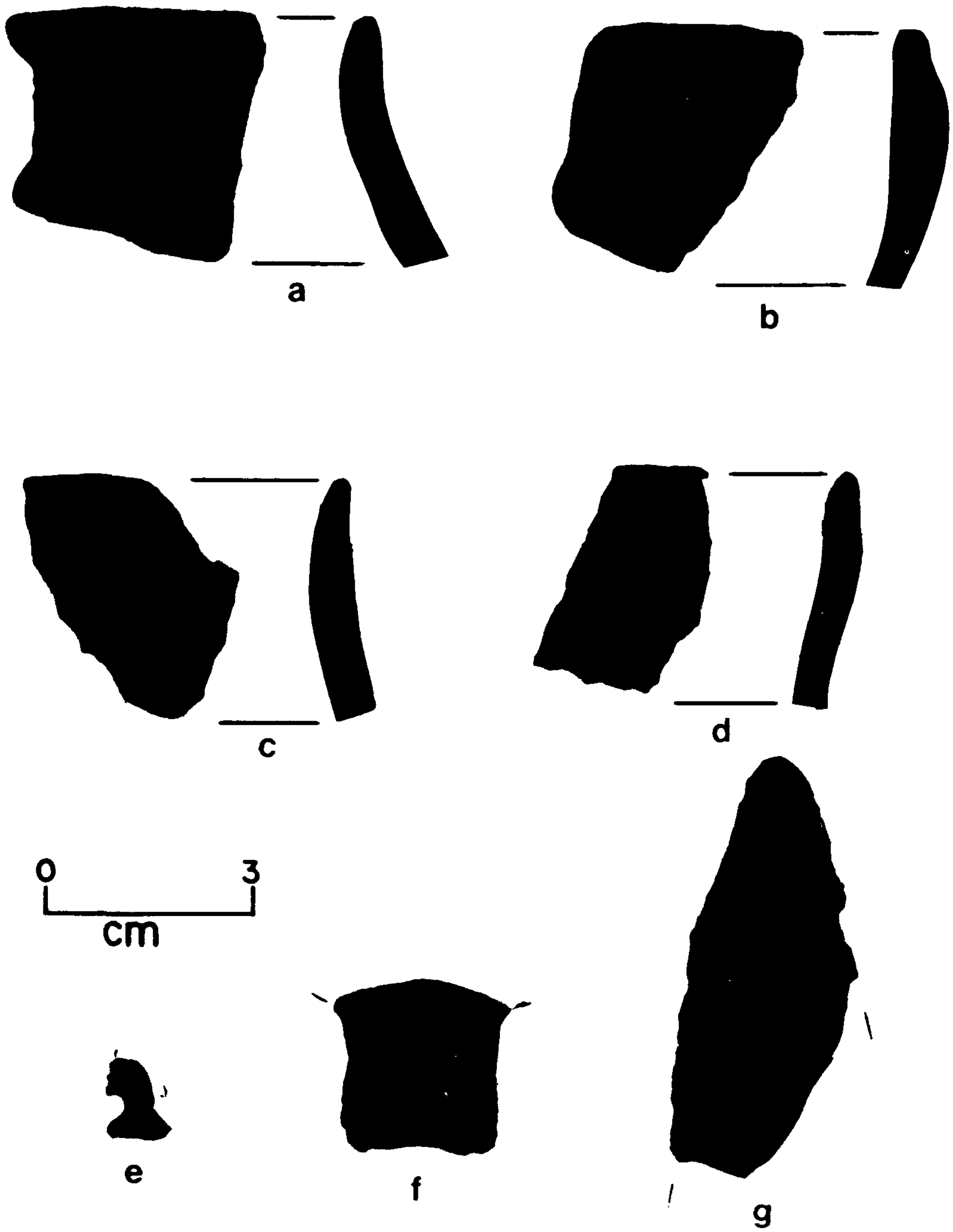


Figure 6.47. Selected artifacts from Mounds 14JF448 and 14JF449.
a) partially smoothed over rim sherd, JF448880001 b-d) tool-impressed rim sherds, JF449880021, JF448880076, 0120 e) Scallorn arrow point, JF448880095 f) square-stemmed biface base, JF448880015 g) biface tip, JF449880023.

Table 6.41 Cultural Material Recovered from 14JF448.

Test Unit	xul	xul	xul	xul	xul
Level	1	2&3	3	4	5
(cm)	0-10	10-30	30-40	40-50	50-57
Body Sherds	11	70	19	43	19
Rim Sherds	1	5	--	--	2
Potlids	--	3	--	1	--
Shatter	4	16	8	6	3
Flakes	22	71	23	27	31
Cores	--	1	2	--	2
Tested Matl.	1	1	--	--	2
Ret./Ut. Flakes	--	2	1	1	1
Proj. Pts.	--	1	--	--	--
Hammerstone	--	--	--	--	1
Shell	--	5	--	--	1
Seeds	--	2	--	--	--
Bone	4	8	6	11	1 vial
Daub (Grams)	138	446	183	195	270
Limestone (Grams)	7	57	57	562	510
Sandstone (Grams)	15	45	87	--	--
Quartzite (Grams)	75	340	128	230	315

Table 6.41 (cont.)

Test Unit	xu2	xu2	xu2	xu2	xu2	xu2
Level	1	2	3	4	5	6
(cm)	0-10	10-20	20-30	30-40	40-50	50-59
Body Sherds	17	15	65	14	12	37
Rim Sherds	--	1	3	1	1	--
Potlids	--	2	1	1	--	--
Shatter	7	10	12	5	9	12
Flakes	23	20	32	19	27	25
Cores	--	--	4	2	4	2
Tested Matl.	--	--	2	1	1	--
Proj. Pt.	--	--	--	--	1	1
Shell	--	--	1	--	--	--
Seeds	3	--	--	--	--	--
Daub (Grams)	203	145	172	191	131	599
Lmstone (Grams)	5	33	136	140	205	1013
Sdstone (Grams)	2	--	2	--	12	--
Qrtzite (Grams)	27	32	280	11	198	350

The assemblage from 14JF449 consists of 103 ceramic and 206 lithic artifacts from one test unit. The two rim sherds (e.g., Fig. 6.47b) and body sherds are similar to those found in mound 14JF448 (see chapter 8). The lithic assemblage includes one biface fragment (Fig. 6.47g), ten cores and 198 pieces of lithic manufacturing debris. Also recovered from the excavation were small amounts of shell, bone, burned limestone, sandstone, and fire-cracked quartzite (Table 6.42)

Table 6.42 Cultural Material Recovered from 14JF449.

Test Unit	xu1	xu1	xu1	xu1	xu1	xu1
Level	1	2	3	4	5	6
(cm)	0-10	10-20	20-30	30-40	40-50	50-55
Body Sherds	18	15	11	24	31	4
Rim Sherds	--	--	--	2	--	--
Potlids	--	--	--	2	1	--
Shatter	4	8	2	9	8	4
Flakes	20	28	26	35	35	13
Cores	--	3	1	2	2	2
Tested Matl.	1	--	--	--	1	1
Biface	--	--	--	1	--	--
Shell	--	--	--	--	--	25
Bone	--	--	--	5	1	??
Daub (Grams)	9	9	8	20	38	11
Lmstone (Grams)	--	--	144	97	854	164
Sdstone (Grams)	--	22	92	73	22	--

Flotation

Two flotation samples were collected from each of the test units at 14JF448 (Unit 1, 50-60cm; Unit 2, Feature 1, 56-66 cm). The heavy fraction from each yielded material shown in Table 6.43.

Table 6.43 Cultural Material from Flotation at 14JF448.

Test Unit	xu1	xu2
Level	5	Feature 1
(cm)	50-60	56-66
Body Sherds	34	--
Chips	84	60
Bone	82	66
Charcoal (Grams)	1	2.5
Seeds	6	--
Daub (Grams)	120	884
Quartzite (Grams)	5.5	--
Sandstone (Grams)	4.5	--

Interpretation

14JF448/449 is a Plains Woodland, Grasshopper Falls phase occupation site. Given the large artifact counts recovered from each of the earthen mounds, they must represent a prolonged occupation similar to that at 14JF420. While no structural features were located, the large quantities of daub recovered from Mound 14JF448 are evidence of a lodge of wattle and daub construction.

With the exception of the large quantities of daub in 14JF448, artifact contents and their vertical and horizontal distributions were quite similar in the mounds and may indicate contemporaneity. Like the mounds at the Quixote site, those at the Reichart site may represent habitation structures, though this should be considered tentative. The cultural material obtained from the excavations indicates a relatively extended occupation where a wide range of activities took place.

Recommendations

Testing indicated that the upper portions of the mounds have been partially disturbed by rodent activity and tree root displacement. However, lower levels (Levels 3-6) contain relatively intact cultural material. As is the case for the mounds at 14JF420, these similar features contain significant research potential and are therefore considered eligible for the National Register of Historic Places. Suggested goals for future investigations at the Reichart site are presented in Chapter 10.

14JF450

Name: Unnamed **Recorded:** Reichart 1974
Cultural Affiliation: Plains Woodland (Grasshopper Falls phase)
Topographic Setting: Foot Slope **Elevation:** 267-270 msl
Parent Material: Loess/limestone **Slope:** 3-7%
Drainage: Delaware River **Site Size:** 2100 m^2
Ground Cover: Grass, brush, timber
Land Use: Wildlife **Surface Visibility:** 0-10%
KVE Investigation: August 27-28, 1988

Previous Investigations

This site was recorded by Milton Reichart and reinvestigated by Environmental Systems Analysis in 1985. Reichart recovered "many" potsherds (e.g., Fig. 6.48) and some of the larger ones are believed to have come from below the plow zone before being eroded from their deposits by wave action. Reichart's collection also includes a celt, nutting stone, corner-notched dart points, contracting stemmed dart

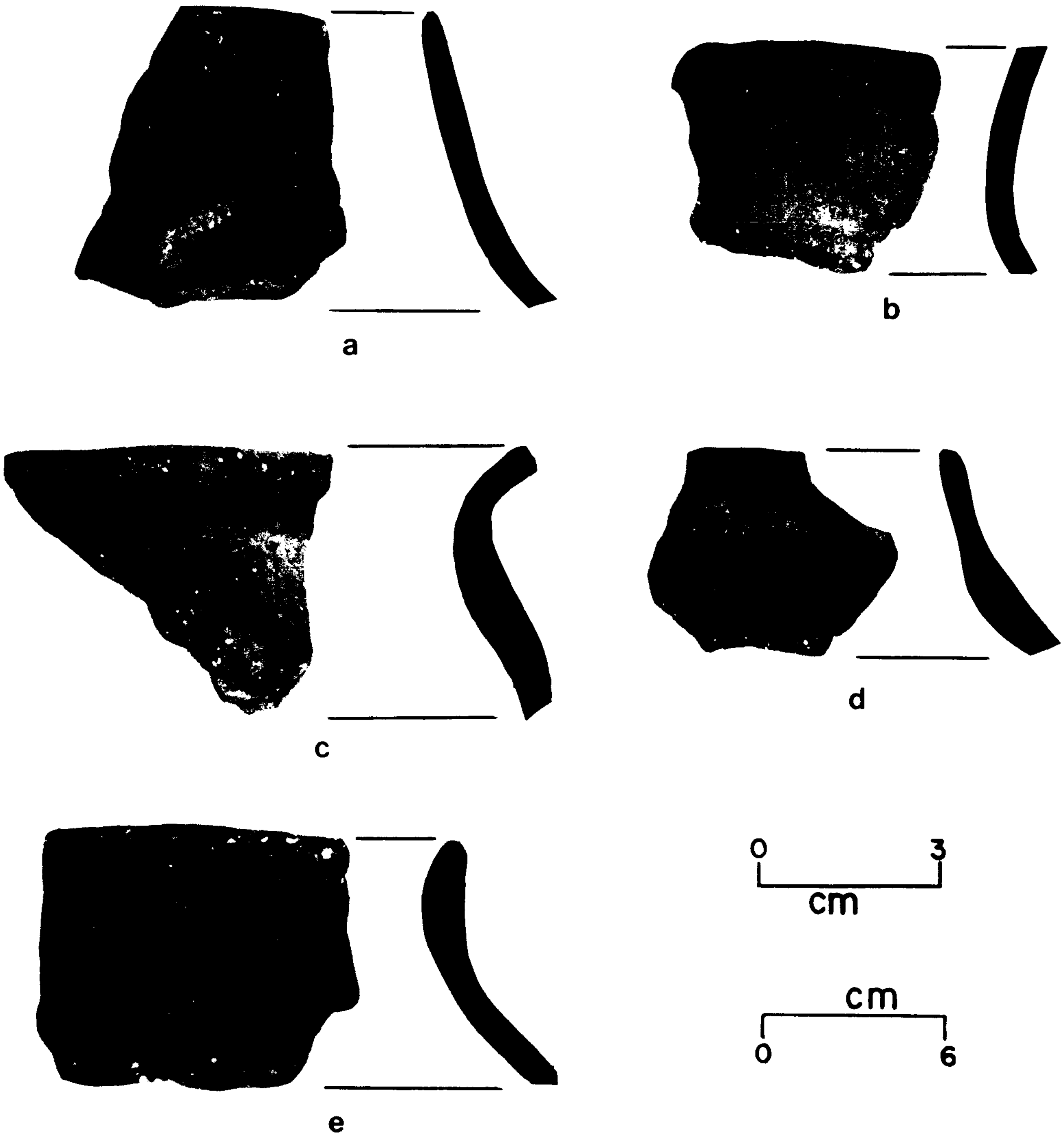


Figure 6.48. Selected rim sherds from 14JF450 in the Reichart collection, Kansas State Historical Society. a,d) constricted b) flaring c) everted e) slightly flared, tool impressed. Artifacts a-b, and d are to 6 cm scale.

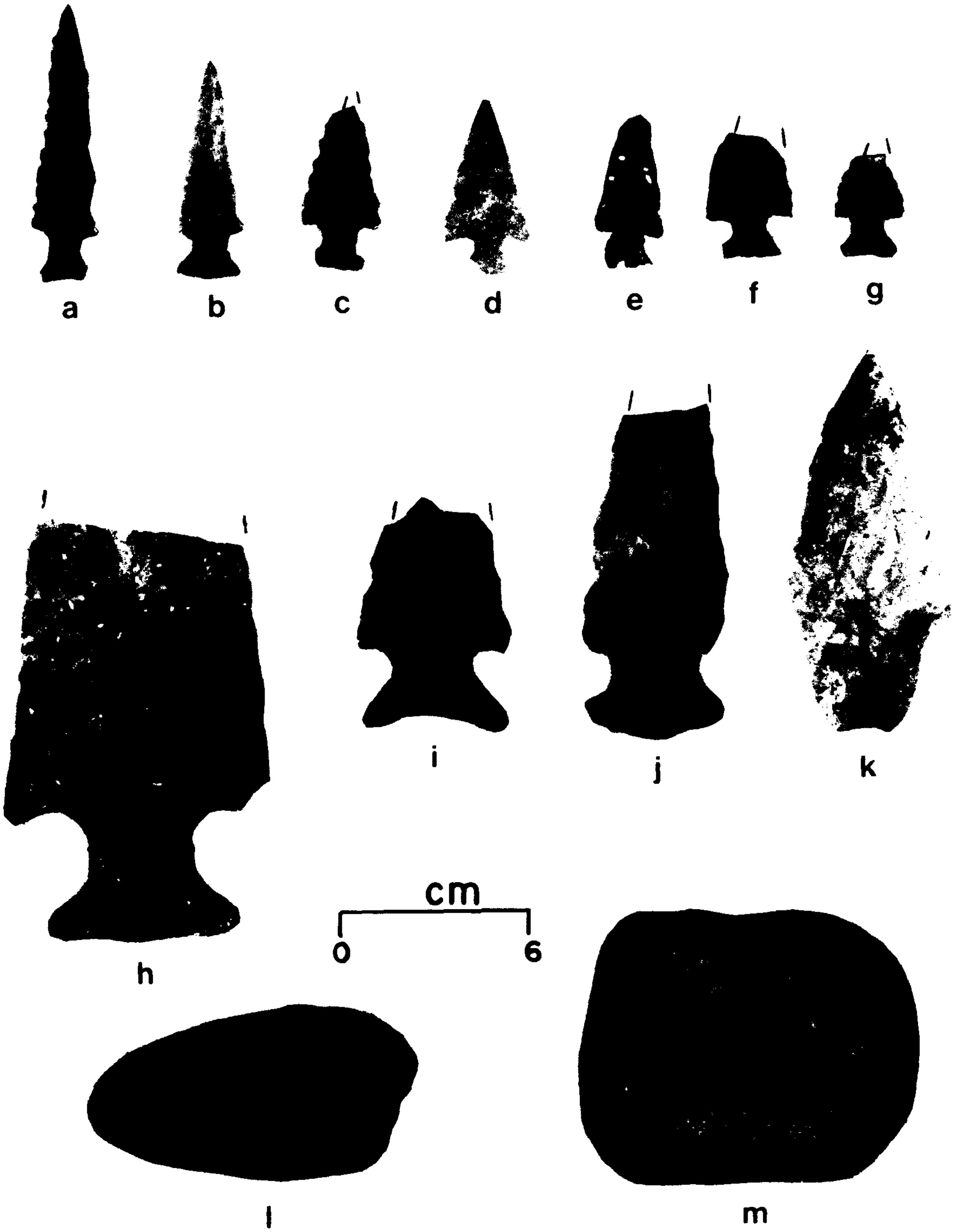


Figure 6.49. Selected lithic artifacts from 14JF450. a-g) Scallorn arrow points h-j) corner-notched bifaces k) contracting stemmed biface l) celt m) pitted grinding stone. Artifact c: JF450880018; all others, Reichart collection, KSHS. Artifacts l-m are to 6 cm scale.

points, and Scallorn arrow points (Fig. 6.49). He also recovered one blade, and "sharpening block of sandstone [and] a few pieces of burned clay, one of which has grass impressions" (Kansas Archeological Site Survey Form). Reichart also suggested that most of the site had been destroyed by wave action from Perry Lake and that following the closing of the dam, artifacts were much more prevalent than today (Milton Reichart, personal communication). This observation was supported by a local collector from Leavenworth, Kansas who informed us during our fieldwork that he had obtained numerous projectile points from the site as well as a human burial which he found eroding from the wave cut terrace scarp. The present location of this material is unknown to him and we were thus unable to confirm his finds.

ESA resurveyed the site and recovered potsherds, one projectile point, bifacial and unifacial tools, and debitage. The surveying party noted burned limestone and debitage in the area and suggested that while the site had been partially destroyed, intact deposits might exist beyond the shoreline in an area that corresponds to the 900 ft msl contour on the U.S.G.S. topographic map (Parisi 1987:161). Both investigations noted concentrations of cultural material along the southwestern edge of the site. According to Parisi (1987:161), "this ... may represent an area of specialized refuse disposal or perhaps a deflated storage feature or trash filled pit". On the assumption that intact deposits might occur in the portion of the site above 900 ft msl, the site was recommended for National Register evaluation.

Geomorphic Setting

The unnamed site 14JF450 is located on the foot slope of the Delaware River valley wall at an elevation of about 267-270 m msl. The site is located on the Gymer silt loam (Gy) as mapped by Dickey and others (1977). This moderately sloping soil is characteristically found on lower side slopes and foot slopes. Disturbance of the site has occurred through pre-impoundment cultivation, aggradation by high lake level(s), and lateral erosion of the site by wave cutting.

Soil stratigraphy was examined via Test Unit 2, east profile, and the wave-cut scarp on the west side of the site. Table 6.44 presents a composite soil description derived from the two profiles available. The upper 2 cm of stratified silt is presumably from deposition during a high lake level; local slope is seemingly too slight and a source area too distant for sheet wash (colluviation) to be the source. The plow zone (Ap horizon) is well preserved, indicating cultivation occurred up until the reservoir was constructed/filling. Some erosion of the soil is evidenced: the Ap rests directly upon the Bt 1 horizon, indicating the BA horizon was eroded and enveloped by the Ap. Illuvial clay is present in sufficient amounts to produce Bt horizons. A

high water table has gleyed the lower-most portion of the exposed profile. Overall, the soil is a very good representative of the Gymer silt loam, a Typic Argiudoll.

Table 6.44. Description of Soil Profile from Test Unit 2 and Wave-Cut Face at 14JF450.

Depth (cm)	Soil Horizon	Description
0-2	water-lain	Brown (10YR 5/3) finely laminated silts and sediment sands; friable; abrupt smooth boundary.
2-15	Ap	Dark brown (10YR 3/3) silt loam; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.
15-27	Bt1	Dark grayish brown (10YR 4/2) heavy silt loam; moderate medium subangular blocky structure; friable; slightly acid; gradual smooth boundary.
27-55	Bt2	Dark brown (10YR 3/3) heavy silty clay loam; moderate medium subangular blocky structure; firm; medium acid; gradual smooth boundary.
55-65+	Btg	Grayish brown (2.5Y 5/2) heavy silty clay loam; moderate coarse blocky structure; very firm; common distinct yellowish brown (10YR 5/6) mottles; slightly acid.

1988 Investigations

14JF450 was investigated August 27 and 28. At this time the site was covered with tall grass, brush, and light timber with 0-10 percent visibility. The site was located on a gently sloping terrace on the east shoreline of Perry Lake (Fig. 6.50). Wave action had removed a portion of the terrace leaving a sharp vertical profile of the terrace approximately one meter in height. Due to the low lake level, a 30-meter wide beach was present at the time of our geomorphic inspection of the site on October 5. Both the wave-cut terrace and the exposed beach were intensely examined then and during the time of our test excavations when the beach was only about 2 m wide. On both occasions these areas were void of cultural material.

Because of the dense vegetation, a series of 10 shovel tests was excavated to define the areal extent of the site. The site covered an area of 2100 m^2 measuring 30 m

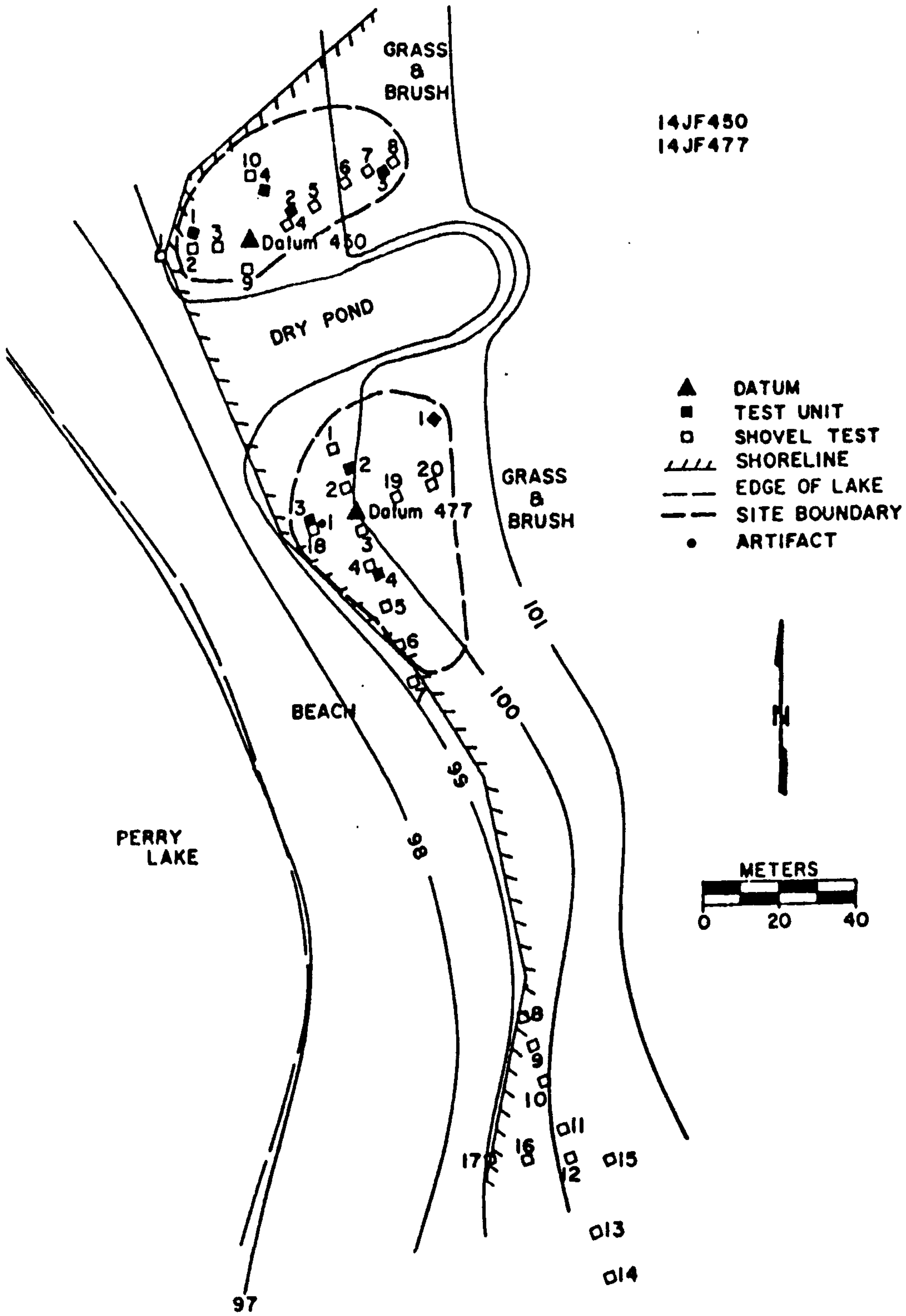


Figure 6.50. Map showing location of shovel tests and test units at 14JF450 and 14JF477.

north-south along the shoreline and 70 m east-west (Fig. 6.50). Artifacts from shovel tests were quite meager and indicated a very thin, sandy, Ap soil horizon that had been subject to scouring action by Perry Lake. Test units were placed in areas of past artifact concentrations and that area above the 900 msl where ESA had suggested a partially intact A horizon might be present.

Artifacts were located within the A or Ap soil horizon and within large desiccation cracks in the Bt soil horizon. This material composes a small assemblage of ceramics, chipped stone tools, cores and lithic manufacturing debris (Table 6.45). The unit excavated above the 900 msl elevation did not contain intact artifact concentrations, but indicated that the upper soil horizon had also been subject to deflation by wave action.

Assemblage

Artifacts from 14JF450 were recovered from four test units. They include 10 small body sherds, 85 pieces of lithic manufacturing debris, two cores and one projectile point. The ceramics were small with highly eroded surfaces although they appear to represent a Plains Woodland affiliation (see chapter 8). The projectile point found in Unit 4, Level 1 was a small Scallorn arrow point (Fig. 6.49c) typical of a Plains Woodland occupation and comparable to those found in greater numbers by Reichart.

Table 6.45. Cultural Material Recovered from 14JF450.

Test Unit	xu1	xu1	xu2	xu2	xu2	xu3	xu3
Level	1	2	1	2	3	1	2
(cm)	0-10	10-20	0-10	10-20	20-30	0-10	10-20
Body Sherds	8	--	--	--	1	--	--
Shatter	2	--	2	--	1	--	--
Flakes	14	--	4	5	1	--	1

Table 6.45 (cont.)

Test Unit	xu3	xu4	xu4	xu4	ST3*	ST4
Level	3	1	2	3	1	1
(cm)	20-25	0-10	10-20	20-30	0-30	0-30
Body Sherds	--	1	--	--	--	--
Shatter	--	16	1	--	--	1
Flakes	--	31	4	--	1	--
Core	--	2	--	--	--	--
Tested Matl.	--	--	1	--	--	--
Proj. Pt.	--	1	--	--	--	--

*Shovel Test

Interpretation

14JF450 is restricted to the upper Ap soil horizon and has been subject to severe erosion by wave action from Perry Lake. The present artifact assemblage indicates a short term campsite belonging to the Grasshopper Falls phase of the Plains Woodland period. Communication with a local collector indicated that 14JF450 also contained a burial though this could not be substantiated. The greater abundance and variety of artifacts recovered by Reichart may indicate a more prolonged occupation or periodic reoccupation of the site during the Grasshopper Falls phase.

Recommendation

This site has been subjected to agricultural practices and erosion by wave action. These effects have destroyed whatever integrity the site may have possessed. On the basis of these findings, it is suggested that 14JF450 does not warrant consideration for the National Register.

14JF477

Name: Unnamed **Recorded:** Reichart 1978
Cultural Affiliation: Plains Woodland (Grasshopper Falls phase)
Topographic Setting: Foot Slope **Elevation:** 267-270 m msl
Parent Material: Loess/limestone **Slope:** 3-7%
Drainage: Delaware River **Site Size:** 2600 m^2
Ground Cover: Grass, brush, timber
Land Use: Wildlife **Surface Visibility:** 0%
KVE Investigation: August 28, 1988

Previous Investigations

This site is located approximately 100 m south and opposite a shallow ravine from 14JF450. It was recorded by Milton Reichart as a small scatter of prehistoric artifacts found along the shoreline in 1978. Material recovered at that time included three grit tempered potsherds, one projectile point fragment, two bifaces and debitage (Kansas State Historical Society Archeological Site Form). Reichart revisited the site in 1982 and noted a shell-filled hearth about 1.45 m long exposed along the south bank of the previously mentioned ravine. The feature contained "20 HUGE sections of clam shells, 2 potsherds, 3 fragments of burned clay" burned limestone and black shale (Kansas State Historical Society Archeological Site Form). Diagnostic artifacts in the Reichart collection at the KSHS, including Grasshopper Falls ware, contracting-stemmed and corner-notched points, a corner-tanged knife, Scallorn arrow points, and scrapers are shown in Figures 6.51-52.

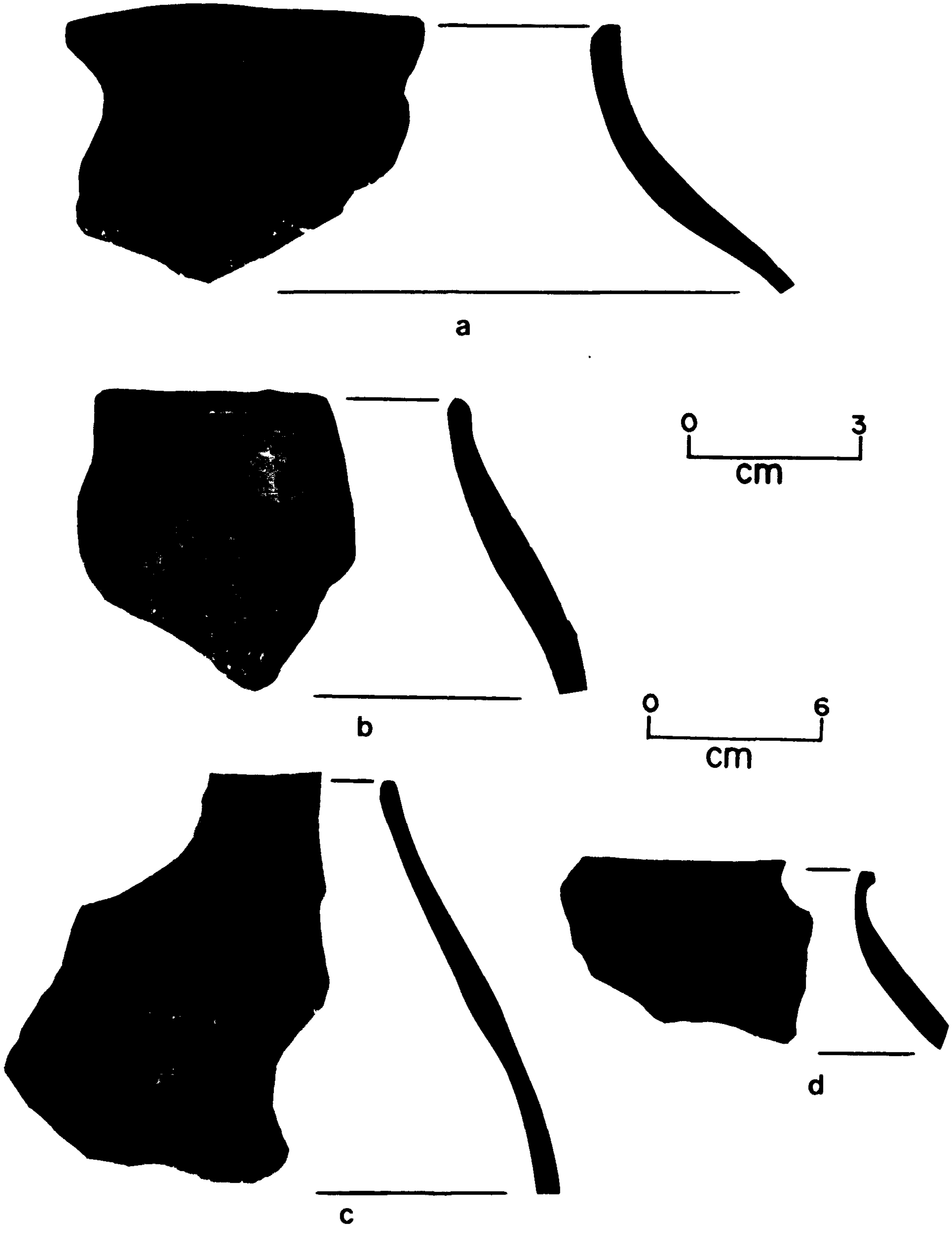


Figure 6.51. Selected rim sherds from 14JF477 in the Reichart collection, Kansas State Historical Society. a-d) constricted. Artifacts c-d are to 6 cm scale.

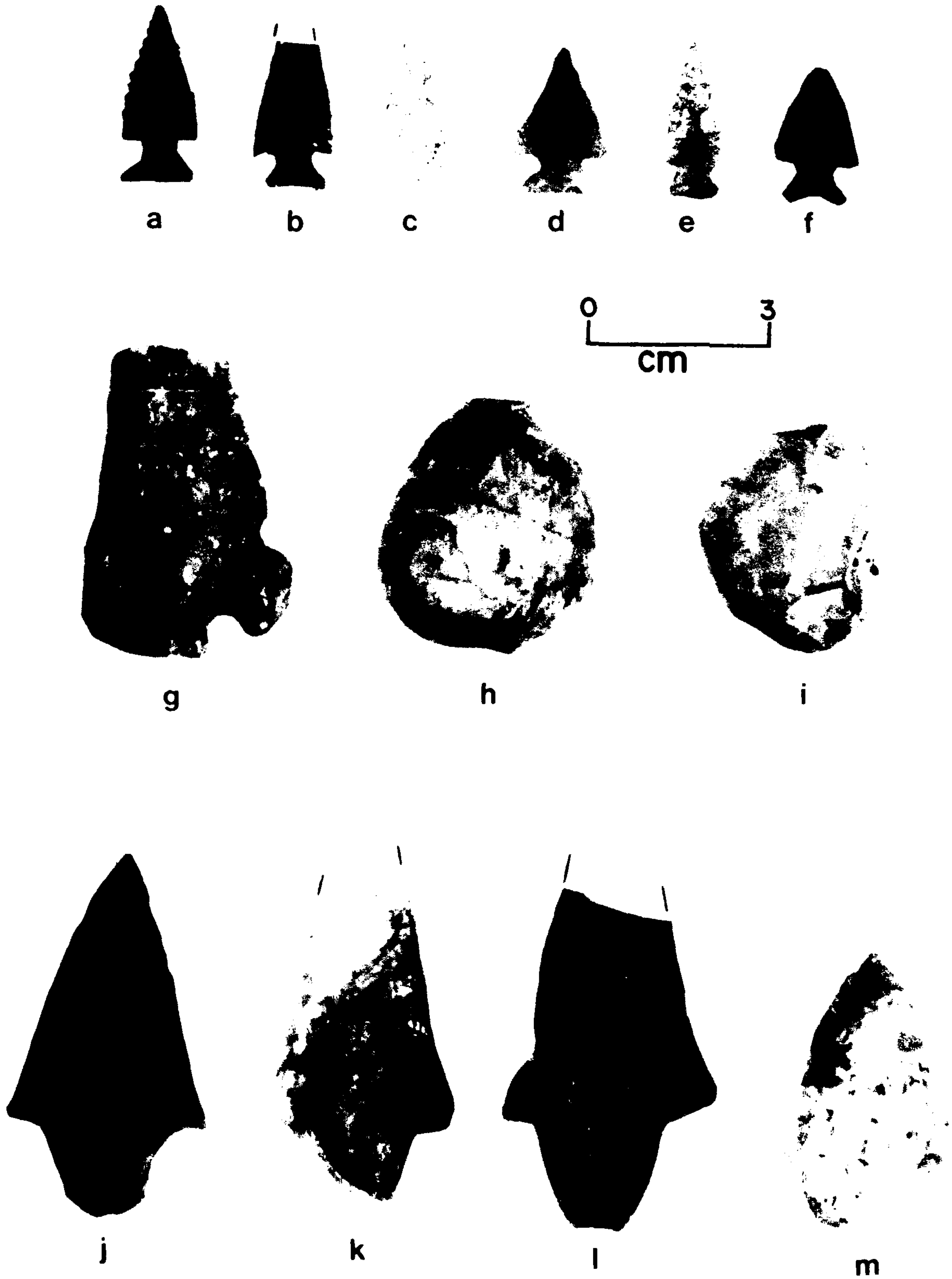


Figure 6.52. Selected lithic artifacts from 14JF447 in the Reichart collection, Kansas State Historical Society. a-f) corner-notched arrow points g) corner-tanged knife h-i) endscrapers j-m) contracting-stemmed bifaces.

The site was later investigated by Environmental Systems Analysis in 1985. This survey indicated that "a light to moderately dense scatter of prehistoric ceramic and lithic artifacts [occurred] along a 300 m stretch of the eroded shoreline, covering an area of approximately 9,000 square meters" (Parisi 1987:171). A total of 82 artifacts was recovered from the surface; they included two rim sherds, two body sherds, chipped stone artifacts, debitage, one piece of worked stone and several pieces of unworked stone. These artifacts support Reichart's suggested Plains Woodland cultural affiliation. Five shovel tests were excavated along the beach and higher up the bank. While these were all culturally sterile, it was suggested that the upper 30 cm of the A horizon was intact and that it might contain cultural material (Parisi 1987:173).

Geomorphic Setting

The unnamed site 14JF477 is identical, for purposes of this investigation, to site 14JF450. Topography, geomorphology, and soil stratigraphy do not differ significantly. Therefore the reader is referred to the discussion of the previous site.

1988 Investigations

Initial investigations began at this site August 28 with survey conditions and topography identical to that at 14JF450. The site consisted of a wide eroded shoreline with an abrupt scarp at a higher surface that gradually sloped upwards from the lake shore (Fig. 6.50). This surface was covered with weedy vegetation and light timber. A series of 20 shovel tests was excavated to determine the areal extent of the site. The site covered an area 80 m north-south along the shoreline and 30 m east-west or approximately 2600 m^2. This is much smaller than the 9000-square-meter area suggested by ESA that included the eroded shoreline and a large portion of the inundated beach. We did not relocate the hearth noted by Reichart in 1982, but did note a concentration of debitage and unmodified stone that had eroded from the wave cut shoreline in an area of light timber. Artifact 1, a body sherd, was found in this area (Fig. 6.50).

A datum was established and four test units were excavated. Artifacts were limited to the upper 10 cm of a soil which had been reworked by wave action. As at 14JF450, large desiccation cracks extended throughout the lower Bt horizon. Artifacts were not numerous and consisted largely of lithic manufacturing debris, a few ceramics (Table 6.46), and a small assemblage of historic artifacts (Appendix 1).

Assemblage

A total of 12 ceramic body sherds and 100 pieces of lithic manufacturing debris was recovered from the site. Like 14JF450, the ceramics are small with highly eroded surfaces, and appear to represent a Woodland occupation (see chapter 8). This interpretation is strongly supported by the ceramic assemblage in the Reichart collection at the Kansas State Historical Society.

Table 6.46. Cultural Material Recovered from 14JF477.

Test Unit	xu1	xu1	xu1	xu2	xu2
Level	1	2	3	1	2*
(cm)	0-10	10-20	20-25	0-10	10-20
Body Sherds	--	--	--	--	--
Potlids	--	1	--	--	--
Shatter	5	--	--	5	--
Flakes	7	--	--	7	--

* one-half level excavated

Table 6.46. (cont.)

Test Unit	xu3	xu3	xu4	xu4	ST18**
Level	1	2	1	2	1
(cm)	0-10	10-20	0-10	10-18	0-30
Body Sherds	9	--	2	--	--
Shatter	18	--	5	--	1
Flakes	39	--	12	--	--

**shovel test

Interpretation

Like 14JF450, this site is restricted to the disturbed sandy Ap soil horizon and has been subjected to severe erosion by past agriculture and wave action. The small artifact assemblage indicates a short term Plains Woodland campsite where lithic production and food processing/storage took place. Greater quantities of lithic tools and Grasshopper Falls phase ceramic ware in the Reichart collection may reflect a longer occupation or periodic reoccupations.

Recommendations

The site has suffered deflation due to agriculture and wave action from Perry Lake. Given these findings and the present lack of artifact content, 14JF477 is not considered eligible for nomination to the National Register.

14JF482

Name: Unnamed **Recorded:** Reichart 1979
Cultural Affiliation: Plains Woodland (Grasshopper Falls phase)
Topographic Setting: T-1 Terrace **Elevation:** 268-270 m msl
Parent Material: Alluvium **Slope:** 0-2%
Drainage: Delaware River **Site Size:** ca. 600 m^2
Ground Cover: Grass **Land Use:** Wildlife
Surface Visibility: 0%; 100% on cut-bank
KVE Investigation: August 21-22, 1988

Previous Investigations

This site was recorded by Milton Reichart in 1979 when he noted artifacts eroding at two levels along approximately 20 meters of the east bank of the Delaware River. The upper level occurred at a depth of 1.5 m and consisted of two body sherds (Fig. 6.53a-b) and a corner-notched biface (Fig. 6.53c). Animal bone and one small piece of daub were also found at a depth of 80 cm near the extreme northern end of the exposure. In 1977 a hearth consisting of burned limestone, quartzite and granite was found some five meters above the mouth of the intermittent stream immediately south of the site area (Kansas State Archeological Site Survey Form; see Fig. 6.55 for stream location).

Geomorphic Setting

The unnamed site 14JF482 is located within alluvial fill on the left (east) bank of the Delaware River at an approximate elevation of 268-270 m msl. The surface beneath which the artifacts lie is the T-1 terrace. Developed within this terrace is the Kennebec silt loam, the soil typical of this surface within the Delaware River valley (Dickey et al. 1977).

Exposures of the alluvium underlying the terrace were obtained through excavation of three profiles in the cut-bank face and excavation of a backhoe trench perpendicular to the channel. Profiles 2 and 3 (Fig. 6.54) provide a good perspective of the buried A horizon present at the site. The backhoe trench was excavated 7 m long and 2.5 m deep.

Samples for sediment analysis and radiocarbon dating were collected from the trench profile. The results are presented in Table 6.47. As at sites 14JF409 and 410, there

Figure 6.53. Selected artifacts from 14JF482 (a-c) and 14JF484. a-b) body sherds c) side-notched, concave-based biface d) biface e-f) end scrapers g-i) corner-notched dart points. Artifact i: JF484880022; all others, Reichart collection, KSHS.

Figure 6.54. Buried soil horizon in Profiles 2 and 3 at 14JF482.

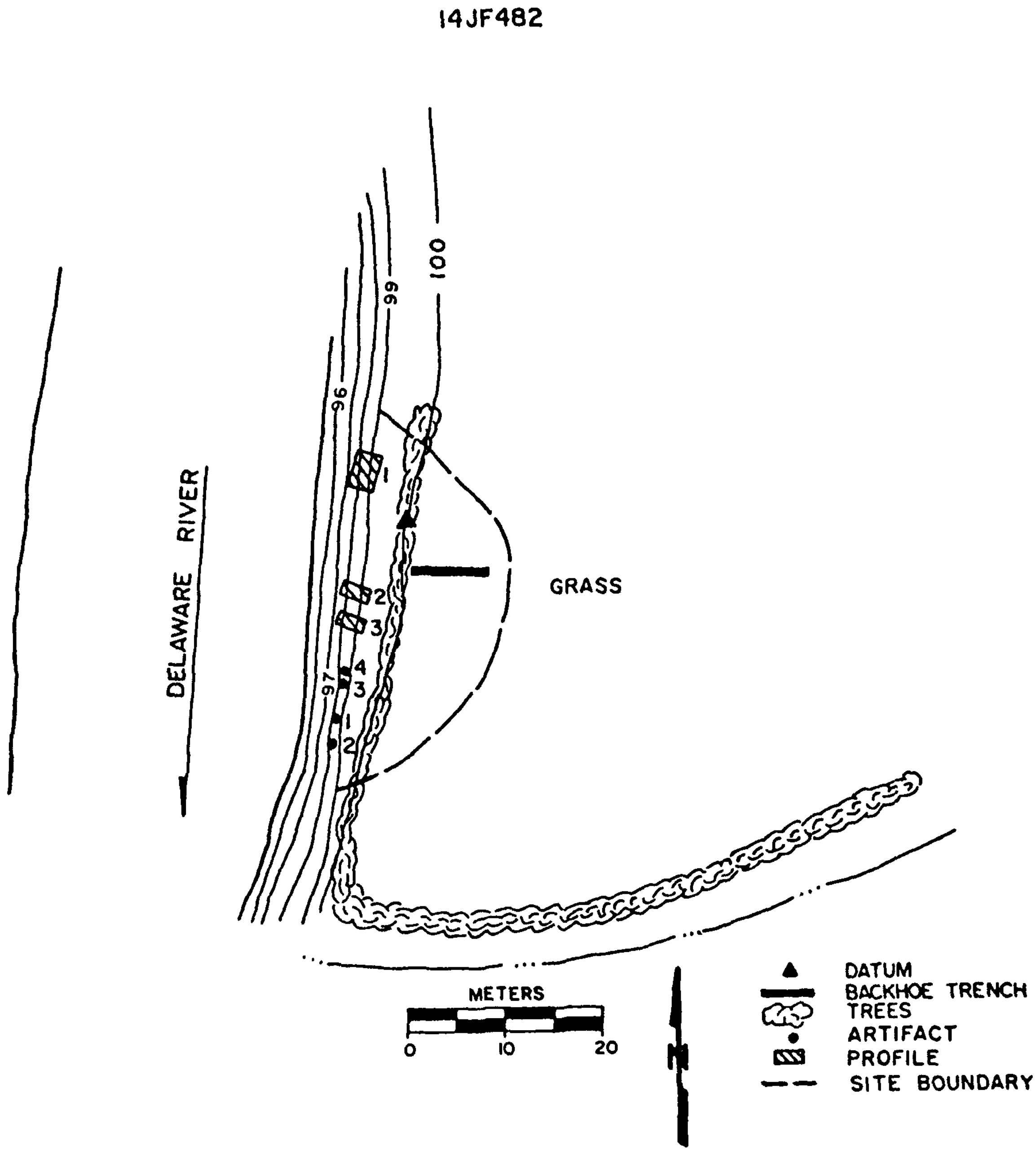


Figure 6.55. Map showing location of profiles, cut-bank finds, and backhoe trench at 14JF482.

is a buried A horizon. The sediments overlying the Ab horizon at this site, however, appear to be of greater antiquity than at the former two sites. This is borne out by the differences in degree of surface soil development and by a radiocarbon age of 2450±70 yr B.P.:500 B.C. (Beta-29657) on the basal Ab horizon at this site compared to an age of 1000±70 yr B.P.:A.D. 950 (Beta-29656) at site 14JF410. Such age differences are often elusive when one uses only terrace elevation as a criterion for age of underlying alluvial fill and any artifacts contained therein.

Given the magnitude of the radiocarbon age on the lower-most Ab horizon, age data from elsewhere in the lower Kansas River basin suggest the surface is a T-1 terrace. Consequently, buried prehistoric cultural material is probably common within the terrace fill here, as well as at 14JF409 and 410.

Table 6.47. Chemical and Physical Sediment Data from Trench 1 at 14JF482.

Sample			Particle-size (%)			Color	LOI	pH
No.	Depth (cm)	Soil Horizon	Sand	Silt	Clay	(Munsell-moist)	(%)	
11	8-13	A1	12(VF,	82(C/MF)	6(F/C)	10YR 2/2	3.16	7.72
10	14-21	"	1(VF/F)	62(C)	37(F)	10YR 2/1	4.77	7.53
9	25-33	"	38(F/M)	52(C/MF)	10(F)	-----	2.45	----
8	56-62	A2	9(VF/F)	66(C/MF)	25(F)	10YR 2/2	4.53	6.79
7	73-83	"	12(VF)	76(MF/C)	12(F/C)	10YR 2/2	3.19	6.73
6	111-120	C	6(VF)	57(C)	37(F)	10YR 2/2	3.63	6.67
5	161-168	Ab	29(VF/F)	68(MF/C)	3(C)	10YR 2/2	3.75	6.79
4*	174-184	"	4(VF/F)	69(MF/C)	27(F)	-----	3.78	----
3	190-199	Bt1	1(VF)	64(C)	35(F)	2.5Y 3/2	3.48	6.79
2	213-220	Bt2	1(VF)	64(C)	35(F)	10YR 3/2	3.59	6.79
1	238-248+	C	3(VF/F)	71(C)	26(F)	10YR 3/3	2.51	6.75

* soil humate-derived radiocarbon age of 2450 ± 70 yr B.P.:500 B.C. (Beta-29657)

1988 Investigations

14JF482 is located in an alluvial fill on the east bank of the Delaware River. The site was relocated and tested August 21 and 22, with subsequent backhoe excavation on October 13. On those dates, the cut-bank was exposed from the surface to

a depth of 2.5 m with a slope 1.5 m in height which continued to the edge of the stream. Artifacts found eroding from the cut-bank include two pieces of burned limestone (Artifacts 1 and 2), a flake (Artifact 3) and a body sherd (Artifact 4) (Fig. 6.55)

A diffuse scatter of burned earth and charcoal was uncovered in a buried soil horizon in Profile 1 at a depth of 150-170 cm. One potsherd was recovered from this area as well as a piece of quartzite located 70 cm to the south (Table 6.48). This level corresponds to a burned earth concentration in Trench 1, located between 145-175 cm below the surface in a buried A horizon. A soil sample was submitted for radiocarbon testing from the lower portion of the same buried A horizon in Trench 1. This was obtained at a depth of 174-184 cm below surface and dated 2450$\pm$70 B.P.: 500 B.C. (Beta-29657; see Geomorphic Setting herein). A lower level of burned earth at a depth of 200-234 cm was also noted in Trench 1. No artifacts were found in either level in Trench 1. It could not be determined whether the burned earth in the lower level indicates an earlier cultural occupation or is attributable to natural firing of the soil.

Table 6.48 Cultural Material Recovered from 14JF482.

Depth of Find (cm)	Profile Number 1 150-180	Profile Number 2 160-180
Body Sherds	1	1
Flakes	1	1

Assemblage

The artifact assemblage from 14JF482 is quite small and consists of three pieces of lithic manufacturing debris, three ceramic body sherds, and two pieces of burned limestone. The single body sherd large enough for analysis is tentatively identified as Plains Woodland ware. Assignment of the site to that period is supported by the sherds in the Reichart collection at the Kansas State Historical Society.

Interpretations

14JF482 is a cut-bank site containing a component of the Grasshopper Falls phase with at least one lower component of unknown cultural affiliation. A radiocarbon date of 2450$\pm$70 B.P.: 500 B.C. was obtained on a sample of the buried soil horizon that contains these components, indicating that the cultural horizon at a depth of 145-175 cm occurred after that time. This date supports but does not necessarily confirm the tentative cultural affiliation of the buried component.

No interpretation of the lower horizon of burned earth (i.e., that at a depth from 200-234 cm) is possible. If the small artifact assemblage is representative of the site, its occupation must have been brief.

Recommendations

Evidence of the hearth feature noted near the south end of the site in 1979 was not observed during the present investigations. The small amount of cultural material collected from this site suggests that it is of limited content and possesses little research potential. Therefore 14JF482 is not recommended for the National Register. As indicated in previous discussions of cut-bank sites, stream action tends to quickly destroy some features and expose others. Given the previous exposure of a feature in the immediate site area, erosion of this site may yet yield information that should be salvaged (e.g., radiocarbon datable charcoal from a hearth feature, etc). Despite the lack of NRHP eligibility of the site as a whole, information from such isolated features may prove valuable for the interpretation of the general prehistory of the Perry Lake Project Area. Thus, periodic inspection of the cut-bank at 14JF482, especially following substantial rains or inundation is recommended.

14JF484

Name: Unnamed **Recorded:** Reichart 1979
Cultural Affiliation: Plains Woodland and Historic Euroamerican
Topographic Setting: Low Upland Ridge **Elevation:** 273m msl
Parent Material: Glaciofluvial deposits **Slope:** 1-3%
Drainage: Intermittent Tributary of Walnut Creek
Site Size: 2200 m^2 **Land Use:** Agriculture
Surface Visibility: 100% **Ground Cover:** Soybeans
KVE Investigation: July 29-30, 1988

Previous Investigations

This site was first recorded by Milton Reichart in 1979. Artifacts recovered then include an unnotched projectile point (Fig. 6.53d), two corner-notched projectile points (Fig. 6.53g-h), end scrapers (Fig. 6.53e-f), mano fragments, debitage, a core, and a piece of burned limestone interpreted as evidence of an Archaic occupation. Historic debris attesting to a later Euroamerican occupation was also noted (Kansas State Historical Society Archaeological Survey Form). The site is located on the top and sides of a small, low knoll below the upland ridge that contains sites 14JF414 and 14JF421.

Later investigation by Environmental Systems Analysis included an intensive pedestrian survey and the excavation of three shovel tests which resulted in recovery of 203 prehistoric and eight historic artifacts. The prehistoric artifacts include three ceramic body sherds, three projectile points, two biface blanks, three biface fragments, two scrapers, modified flakes, eight cores, three hammerstones, and lithic manufacturing debris. Two of the shovel tests were sterile, but one contained two flakes at a depth of 15-25 cm, suggesting that the site might contain intact cultural deposits. On the basis of this finding, ESA recommended the site for test excavation in order to determine its National Register eligibility (Parisi 1987:175-177).

Geomorphic Setting

The unnamed site 14JF484 is located on a low upland area situation between the Delaware River and Walnut Creek, at an elevation of about 273 m msl. Soils are mapped as the Shelby-Pawnee complex (Sc) in the Jefferson County soil survey (Dickey et al. 1977). The Shelby-Pawnee complex soils are deep, moderately sloping Typic Argiudolls and Aquic Argiudolls developed within glacial till and glaciofluvial deposits. The soil at this site is moderately eroded through slope wash.

Soil stratigraphy was examined in the three shallow test units and a 7.6-cm diameter core extracted with the Giddings soil probe. A description of the soil profile obtained from the latter is presented in Table 6.49. The Bt horizonation is particularly well developed.

The soil is heavy textured, dark in color, and mottled and gleyed at depth. Soil erosion and great age of the parent material explain the restriction of cultural material to the Ap horizon and primarily the upper 5 cm. The site is located on a nose of glacial deposits that extends down into the valley bottoms, where it is surrounded by lower lying alluvium. Good drainage and proximity to water, as well as the uplands, may have been the attraction of this site.

Table 6.49. Description of Soil Profile in Core 1 at 14JF484.

Depth (cm)	Soil Horizon	Description
0-8	Ap1	Very dark gray (10YR 3/1) silt loam and few pebbles; weak fine granular structure; friable; slightly acid; gradual smooth boundary.
8-22	Ap2	Very dark brown (10YR 2/2) silt loam and few pebbles; moderate fine granular structure; friable; slightly acid; gradual smooth boundary.
22-42	Bt1	Dark yellowish brown (10YR 4/4) heavy clay loam and few pebbles; moderate medium subangular blocky structure; firm; slightly acid; gradual smooth boundary.
42-75	Bt2	Yellowish brown (10YR 5/4) heavy clay loam and few pebbles; moderate medium subangular blocky structure; firm; few fine black concretions; medium acid; gradual smooth boundary.
75-116	BC	Yellowish brown (10YR 5/6) clay loam and few pebbles; weak medium subangular blocky structure; firm; slightly acid; strong brownish yellow (10YR 6/6) mottles; gradual smooth boundary.
116-188+	C	Yellowish brown (10YR 5/4) grading to light yellowish brown (10YR 6/4) silty clay loam and few pebbles; massive; friable; slight gleying in lower 40 cm; strong brownish yellow (10YR 6/6) mottles.

1988 Investigations

The site was investigated July 29 and 30, at which time it was planted in soybeans with 100% visibility between the rows. 14JF484 consisted of a light scatter of prehistoric and historic artifacts 55 m north-south and 40 m east-west (Fig. 6.56). The site is located to the east of an intermittent stream and to the west of Walnut Creek upon a low sloping ridge. The site was surveyed and surface artifacts including ceramics, chipped stone tools, lithic manufacturing debris, and historic ceramics were pin-flagged (Table 6.50; Figure 6.56).

Table 6.50 Surface Artifacts from 14JF484.

Artifact 1	Core
Artifact 2	Projectile Point Fragment (Fig. 6.53i)
Artifact 3	Biface
Artifact 4	Body Sherd
Artifact 5	Historic Ceramics
Artifact 6	Hammerstone
Artifact 7	Biface Fragment
Artifact 8	Core
Artifact 9	Modified Flake
Artifact 10	Debitage
Artifact 11	Ferrous Oxide
Artifact 12	Core
Artifact 13	Biface Fragment
Artifact 14	Biface Fragment
Artifact 15	Body Sherd
Artifact 16	Core
Artifact 17	Burned Quartzite
Artifact 18	Scraper
Artifact 19	Hammerstone
Artifact 20	Body Sherd
Artifact 21	Core
Artifact 22	Hammerstone
Artifact 23	Core
Artifact 24	Marginally Retouched Flake
Artifact 25	Body Sherd
Artifact 26	Body Sherd

Artifacts from excavation units include limited amounts of lithic manufacturing debris, unworked stone, and burned earth (Table 6.51). These were all confined to the Ap soil horizon within which the majority of the artifacts occurred in the upper 5 cm.

Assemblage

The artifact assemblage from 14JF484 is limited to six ceramic body sherds recovered from the surface, 95 pieces of lithic manufacturing debris, nine cores, two utilized flakes, one projectile point, three biface fragments and two hammerstones (Table 6.51). All of the stone tools except two small cores and two utilized flakes were recovered from the surface. The ceramics are relatively small although three were large enough for analysis and are Plains Woodland in affiliation. The projectile point, a small corner notched point lacking both the tip and stem (Fig. 6.53i) is compatible with this affiliation.

14JF484

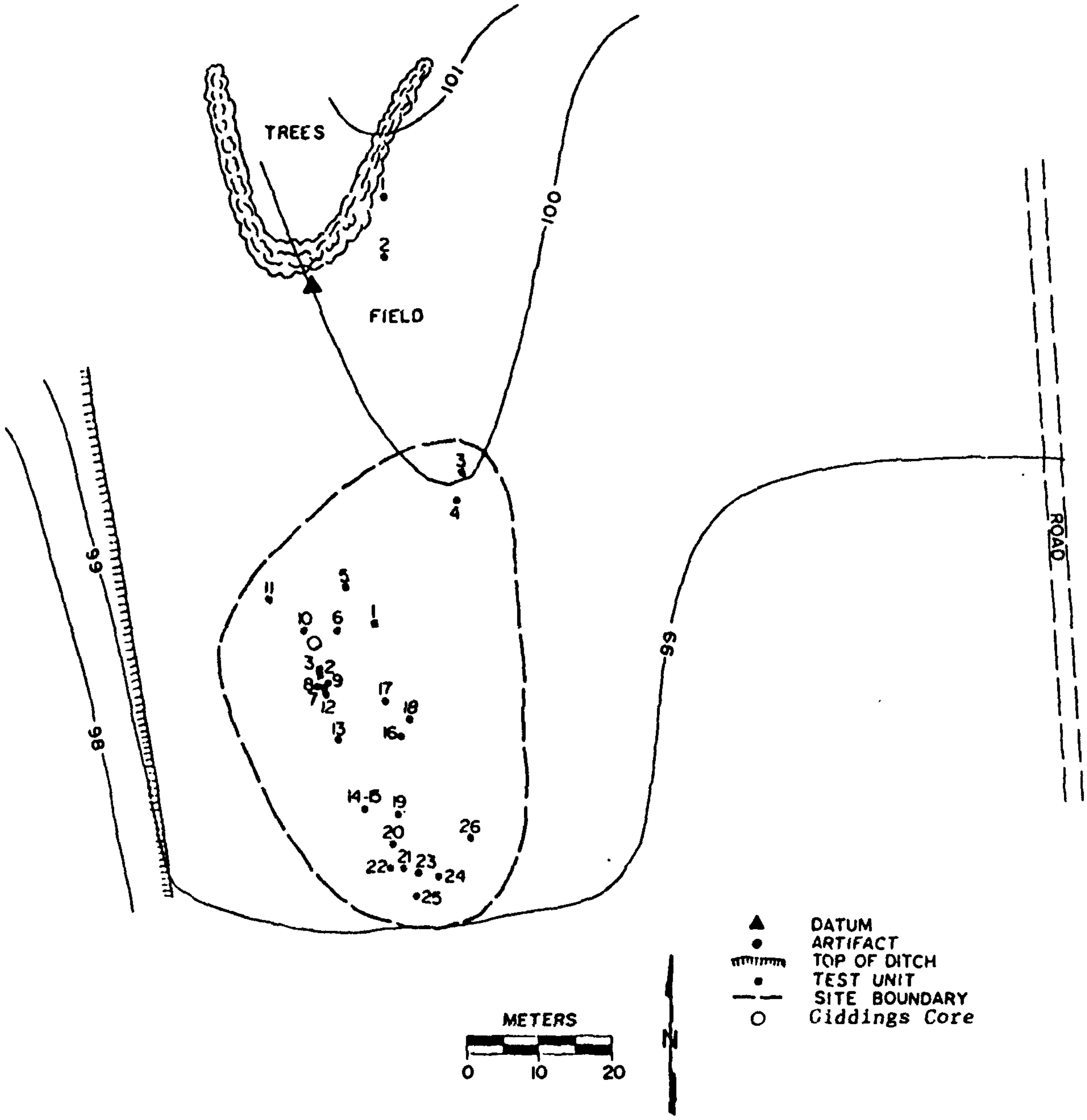


Figure 6.56. Map showing location of surface finds, test units, and Giddings core at 14JF484.

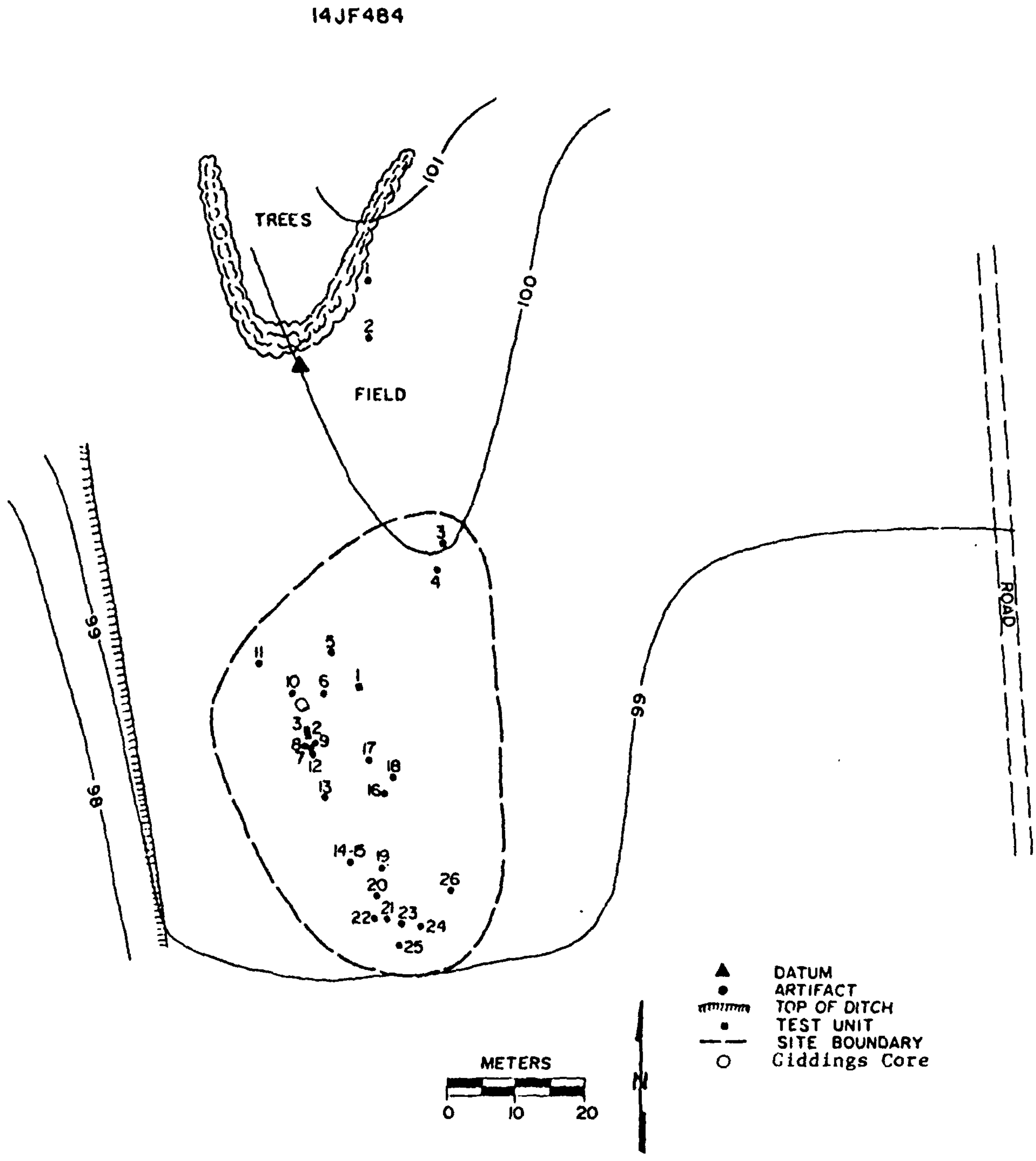


Figure 6.56. Map showing location of surface finds, test units, and Giddings core at 14JF484.

Chapter 7

LITHIC ANALYSIS

Byron Loosle

Introduction

An important aspect of any prehistoric archaeological investigation is understanding a culture's technology. Technology is important because it is the parameter within which a society deals with the environment and extracts those things that it utilizes for all aspects of life. This should not be construed to mean that technology is the only, or necessarily most significant aspect of prehistoric culture. However, it is one aspect more accessible to archaeologists than most others. In prehistoric societies lithic artifacts are of special importance because of their key role in the technology of the cultures being investigated and because they are nonperishable. This chapter addresses the stone tool technology of sites investigated during the present Perry Lake Archaeological Project. It is a more detailed analysis of lithic material tabulated and illustrated in Chapter 6.

The analysis of worked stone material, which includes formal and *informal stone* tools, debitage or other by-products of tool production, and groundstone objects, is primarily intended to provide a description of the lithic assemblages recovered during excavations and also to address relevant research goals of the Perry Lake Project. In the past, lithic analysis primarily consisted of classification schemes. From these classifications chronologies were constructed based on seriation of formal stone tool types. These chronologies are useful in outlining culture history. They now frequently permit the assignment of tentative dates to excavated remains. Current lithic analyses have more ambitious objectives beyond simple tool classification and construction of chronologies. Stone artifacts can be used to interpret activities which occurred at sites. A knowledge of past activities can often be used to help determine site function. Information gleaned from analysis of chipped stone debitage allows reconstruction of stone tool technology, that is, methods of production and maintenance. A fundamental concern of stone tool production, and hence lithic studies, is the procurement of suitable raw materials. In addition to an examination of stone technology, this analysis identifies materials utilized in lithic tool production. Identification of utilized material can help determine possible preferences for and/or distribution of raw material in the study area. Identifying patterns of resource procurement enhances our understanding of prehistoric settlement patterns.

Because the Clinton Lake and Perry Lake Project Areas are in the same geographic region of northeastern Kansas, are both part of the lower Kansas River basin, and share a common cultural heritage, the methods of lithic analysis employed here will follow procedures established for the recent Clinton Lake Archaeological Project by Ritterbush (1987). The analysis and comparison was simplified because the projects had similar scopes and site testing methods. The analysis consists of two stages of examination, one for stone tools and another for debitage. The tools, when possible, are described using commonly accepted classification terms based on artifact morphology and function (see definitions below). This system separates debitage into categories of chips, flakes, shatter, tested pieces, and cores. Included in the debitage analysis are those pieces which exhibit any use wear. Pieces of utilized debitage are considered informal tools. Although part of the tool kit, these artifacts are categorized in the debitage stage of analysis because they were originally created as by-products of stone tool fashioning, and only later selected for utilization.

For each lithic item from both classes a number of attributes were described and recorded. Categories of raw material are:

Toronto chert - Toronto limestone is a member of the Oread Formation, which is Pennsylvanian in age. Chert from this formation has a color of white or pale brown to yellowish brown. It has a fine to medium texture, has a very homogenous nature and is relatively fossil free (Logan 1988a).

Plattsmouth chert - Plattsmouth limestone is also a member of the Oread Formation. Chert from this material has a color which varies from light to dark gray. It is fine grained with abundant fossils, especially fusilinds (Reid 1979).

Flint Hills chert - This category includes several different types of Permian Age cherts that outcrop in the northern Flint Hills, to the west and south of the study area. These cherts have a wide range of colors. Most are shades of blue or gray, although Three Mile chert, which is very common, can be brown. Most of the varieties of Flint Hills chert are fine grained and frequently have a large number of fossils.

White cherts - The sources of these cherts are unknown, but they are distinctive. They are probably Pennsylvanian or Mississippian in age. This category has been divided into the following subcategories based on texture and inclusions:

Fine grained white - This chert is fine grained in texture with few or no fossils or calcite inclusions. It varies in color from a clear pure white to a medium gray, with both shades of these colors often mottled.

Medium grained white - This material has a medium grained texture. It has a color of white to pale yellow or tan. All stone sorted into this category also has small black specks, creating an impression of salt and pepper.

Alluvial cherts - Material sorted into this category consists of fine grained, homogeneous, light-colored agates and banded cherts, almost always water worn. The majority of these cherts were probably deposited in the area as a result of the Kansan glaciation.

Winterset chert - A Kansas City chert, Pennsylvanian in age, with a color of light gray to very dark gray. "Abundant veins, vugs and laminae of bright white calcite give this chert its 'zebra-striped' appearance. Silicified fossil inclusions are common to abundant" (Reid 1980b:123).

Sioux Quartzite - Glacially deposited material that ranges in color from light pink to dark red. The quartz particles are usually well sorted, but the quality of cement is highly variable.

Quartzite - A general category for all other quartzites which were recovered. Most of the these are dark green, well sorted quartzites with a well developed cement.

Unknown - Any material which cannot be comfortably assigned to one of the above categories. Frequently these are pieces of debitage that are heavily burned or too small to provide clear distinguishing marks. No obsidian, alibates or other recognizable exotic materials were recovered during this study.

Another attribute noted in the analysis is the presence of heat modification, which may indicate thermal treatment. Three categories were utilized to sort the artifacts according to this attribute. The first category is for those items which show evidence of extensive heat modification over 50% or more of the piece. Extensive heat treatment is indicated by various reddish shades (Johnson et al. 1972:311), blackening, potlid fractures, and glossy or lustrous flakes scars. A second category comprises those objects which exhibit some form of heat modification over less than 50% of their surface. Objects in the second category do not necessarily represent an active or intentional manipulation by the prehistoric individuals. Natural fires and accidental burning by camp fires could have created the heat modification exhibited on these objects. The final heat treatment category is for those objects which

do not exhibit any evidence of heat modification.

A final attribute recorded in the debitage analysis is the presence of cortex on the dorsal surface of the artifact. Again, three categories were used to separate the lithic objects. Items with cortex on 100% of their dorsal surface are designated as primary or decortification debitage. This material could only be removed as part of initial lithic reduction or tool production. Items with some cortex but less than 100%, were designated as secondary debitage. These items represent an intermediate step in tool production. Finally, tertiary debitage are those items which exhibit no cortex and represent either the final stage of lithic reduction or resharpening (tool maintenance).

Following Ritterbush (1987:199) stone tools are here divided into three categories; informal and formal chipped stone tools and groundstone tools. Informal tools consist of utilized flakes, chips, shatter, and natural chunks. Formal tools are objects with an extremely regular and stylized morphology. Their final shape is a result of human modification rather than fortuitous use. Formal tools also include artifacts which are not yet finished to a final recognizable form, or perhaps were never intended to be "finished", but the entirety or majority of the object's surfaces have been modified through retouch. Formal tools are useful in postulating site activities and are sometimes temporally diagnostic.

Definitions

To facilitate future comparison of lithic data from tested sites in the Clinton Lake Project Area with that described herein, the same definitions used by Ritterbush (1987:200 - 201) are used for this analysis.

FLAKE - piece of lithic material removed from a mass of lithic raw material through force of percussion or pressure and exhibiting one or more of the following characteristics: a) striking platform, b) bulb of percussion, c) compression rings or ripple marks on ventral face, d) erralieure scar, e) thin termination edge.

CHIP - a flake measuring less than two centimeters in length along the flaking axis. This is an arbitrary size distinction useful for identifying flakes generally too small to be utilized, especially without hafting, and fragments often (although not exclusively) produced through pressure flaking techniques.

SHATTER - any piece of chunky or irregularly shaped lithic material exhibiting at least one non-cortical surface and lacking definite flake scars, negative bulbs of percussion, or striking platforms.

CORE - a piece of lithic raw material exhibiting at least three well-defined flake scars and recognizable striking platform.

TESTED PIECE - piece of lithic material with two or fewer flake scars and no regular shape or systematically placed flake scars.

POTLID - an often flattened, conical-shaped piece of heated lithic material produced through spalling of lithic materials during exposure to high temperature.

UTILIZED PIECE - any piece of lithic debitage which exhibits signs of use wear.

BIFACE - a chipped stone tool which has been bifacially flaked. This category can be further divided for those objects which have been worked to a greater extent, based on tool morphology and use wear. These divisions are:

Preform - a biface which is usually symmetrical in shape and thick in cross section. Often striking platforms and hinge fractures remain.

Knife - elongate biface showing signs of utilization along one or more of the lateral edges.

PROJECTILE POINT - triangular or lanceolate often bifacial tool with a sharp tip, well defined blade or two converging working edges, and often a basal hafting element.

UNIFACE - chipped stone object retouched on only one face (unifacially retouched).

END SCRAPER - a chipped stone tool retouched on only one face to produce a relatively steep, regularly shaped, straight to convex working edge on one end.

SIDE SCRAPER - a chipped stone blank retouched on only one face to produce a relatively steep, regularly shaped straight to convex working edge on either one or both lateral edges.

HAMMERSTONE - a hand-held stone of hard, often crystalline, material showing signs of percussion wear along one or more surfaces.

AXE - a roughly oval shaped stone tool created by chipping, pecking, grinding or a combination of these techniques. Along the tool's narrow axis, or slightly off-center, a notch or groove for hafting has been made. Cutting edge of tool is relatively sharp, unlike a maul, which has a blunt end.

Lithic Assemblage Descriptions

14JF38

The lithic assemblage from this site consists of four formal tools and 143 pieces of debitage, including two utilized pieces. The debitage is 42.0% chips, 20.3% flakes, .7% cores and tested pieces and the remainder shatter and potlids. The debitage material is comprised of 29.4% Toronto chert, 21.7% Flint Hills chert, 14.0% Plattsmouth chert, 19.6% white chert (12.6% fine grained and 7.0% medium grained), 9.1% unknown material, 5.6% alluvial cherts and 1.4% Winterset chert. Signs of heat modification were found on 49.0% of the debitage. Heat modification can be found on 43.2% of the Toronto chert, 50.0% of the Flint Hills chert and 35.0% of the Plattsmouth chert. All stages of lithic reduction are represented at the site, although no cores and only one tested piece were found. Decortification material represents 11.2% of the debitage total, secondary debitage 30.1%, and tertiary debitage 58.7%.

The formal tools recovered at this site consist of three projectile point and one biface fragments. The three small, projectile point tip fragments are made of Toronto, Flint Hills and an unknown chert. They are all triangular shaped. The point tips of Toronto and Flint Hills chert were heat treated. The small biface, which appears to be a preform, is Toronto chert.

Past activities at the site include production and maintenance of chipped stone tools. The small number and fragmentary nature of formal tools do not provide much information on prehistoric activities at the site, although game procurement and processing may have occurred.

14JF103

The lithic assemblage of this site consists of 53 pieces of debitage. Chips are 48.2% of the debitage total, flakes 18.5%, cores and tested pieces 9.3% with the remainder being shatter and potlids. Debitage consists of 50% Toronto chert, 16.7% Flint Hills chert, 13.0% Plattsmouth chert, 7.4% unknown material, 5.6% Sioux quartzite, 3.7% quartzite, and 3.7% alluvial cherts. Evidence of heat treatment occurs on 31.5% of the debitage. On 18.5% of the Toronto chert there are signs of heat modification, while 28.6% of the Plattsmouth chert and 55.6% of the Flint Hills chert show similar signs. There are no cores but much of the debitage represents primary reduction flaking. The debitage is 33.3% decortification, 38.9% secondary material and 27.8% tertiary.

The small amount of material recovered makes interpretation of past activities tenuous.

14JF105

Two formal tools and 53 pieces of debitage comprise the lithic assemblage. The debitage total is broken down into 52.8% chips, 20.8% flakes, 9.4% cores and tested pieces and the remainder shatter and potlids. The material composition of the debitage is 50.9% Toronto chert, 34.0% Flint Hills chert, 5.7% Sioux quartzite, 3.8% Plattsmouth chert, 3.8% unknown material, and 1.9% medium grained white. Signs of heat treatment are found on 60% of the site's debitage. Flint Hills chert was extensively heat modified at this site with 84.2% of this type of chert being treated, while 53.6% of the Toronto chert was similarly treated. Two cores and three tested pieces show that primary lithic reduction occurred at the site. In addition 11.3% of the debitage is decortification, 24.5% secondary, and 64.2% tertiary.

The site's formal tools are a biface and end scraper. The biface is a large fragment of a well made piece, probably a Nebo Hill point utilized as a knife. It is made from Flint Hills chert and has been heat treated. The biface appears to not have been completely finished, as evidenced by a steep hinge fracture and large protruding bulb on one face. The end scraper is Toronto chert and shows little use wear.

The small amount of data recovered makes conclusions about the past site activities tenuous, although chipped stone tool production and hide preparation probably occurred.

14JF409

Only one formal chipped stone tool and 16 pieces of debitage were recovered at this site. Two flakes and one core were recovered from the deeply buried Archaic stratum. The remainder of the assemblage was recovered in the disturbed upper levels of the site. Chips constitute 43.8%, flakes 18.8%, and cores and tested pieces 31.2% of the debitage total. The debitage is 56.2% Flint Hills, 18.8% Toronto chert, and 6.2% each of Plattsmouth, Sioux quartzite, quartzite and alluvial cherts. Only one piece of Toronto chert shows signs of heat treatment. In spite of the small sample, all stages of lithic reduction are present, 25% decortification, 25% secondary, and 50% tertiary.

The chipped stone tool is a small biface base fragment of Flint Hills chert, which has been heat modified. Little can be concluded about activities at the site using the present lithic data. Reichart (1988) describes a point of the Meserve or Plainview type that was found at this site (Figure 6.6h). The poor quality of manufacture makes this determination somewhat problematic.

14JF414

The lithic assemblage recovered at this site contains 21 formal tools and 583 pieces of debitage, including nine utilized pieces. The debitage is 67.7% chips, 15.5% flakes, 3.6% cores and tested pieces with the remainder being shatter and potlids. Debitage material consists of 42.4% Toronto chert, 32.1% Flint Hills chert, 11.5% white chert (6.0% fine grained and 5.5% medium grained), 4.3% Plattsmouth chert, 3.1% alluvial cherts, 2.7% unknown material, 1.7% quartzite, 1.2% Winterset, and 1.0% Sioux quartzite. Heat modification was found on 31.8% of the debitage. On 37.2% of the Toronto debitage pieces there is evidence of heat treatment, while 25.6% of the Flint Hills chert and 46.2% of the Plattsmouth chert have signs of treatment. All stages of lithic reduction are evident. In addition to five cores and 15 tested pieces, 13.0% of the remaining debitage is decortification, 20.6% secondary, and 66.4% tertiary.

A uniface, four bifaces, three scrapers, eight projectile points, and five hammerstones comprise the site's stone tool assemblage. The uniface is a retouched piece of Flint Hills chert. Three small biface fragments were found. They provide limited information because of their size. Two are of Flint Hills chert and the other of white medium grained chert. All of these biface fragments were heat treated. The remaining biface is a complete preform of Flint Hills chert. The three scrapers consist of a side scraper, made of Toronto chert, and two end scrapers, one made from a fine grained white material and the other of Flint Hills chert. All of the scrapers have been heavily utilized. The projectile points include one whole and three broken, corner-notched dart points. They are all made of Flint Hills chert. The complete point has been heat modified. Two other projectile point fragments are probably dart tips; they are of Toronto and Plattsmouth cherts. The Plattsmouth point tip was heat treated. Another complete dart point of Plattsmouth chert is a corner-notched point heavily reworked into an unusual leaf shape. The last point from the site is the basal portion of a Scallorn point of fine grained white chert. Four of the hammerstones are quartzite and the other an alluvial chert.

Varied activities occurred at the site. Debitage and cores indicate maintenance and production of chipped stone tools. Scrapers indicate possible processing of hide. Informal tools suggest scraping and shaping of wood and similar material, or possibly butchering game.

14JF417

Seventy-four pieces of debitage, including two utilized flakes and eight formal tools comprise the site's lithic assemblage. Chips constitute 73.0% of the debitage, while

flakes comprise 16.2%, cores and tested pieces 5.4%, with the remaining percentage being shatter and potlids. Debitage is 39.2% Toronto chert, 21.6% Flint Hills chert, 18.9% white chert (16.2% medium grained and 2.7% fine grained), 8.1% alluvial cherts, 6.8% unknown material, 4.1% Plattsmouth chert, and 1.4% Sioux quartzite. Signs of heat modification were found on 32.4% of the debitage. Evidence of heat treatment was noted on 32.3% of the Toronto chert and 31.8% of the Flint Hills chert. All stages of lithic reduction are represented in the assemblage. Three cores and one tested piece indicate a primary reduction stage. In addition, the debitage is 17.1% decortification, 15.7% secondary and 67.1% tertiary.

The formal chipped stone tools consist of six bifaces and two projectile points. Three biface fragments are too small to reveal much about function or cultural affiliation. One is of Toronto chert, the other two are of Flint Hills chert. One of the Flint Hills fragments has been heat modified. Two preforms of Flint Hills chert were also found. One of these preforms is fragmentary, utilized and heat treated. The remaining biface is a retouched flake. The two projectile points are Plains Woodland Scallorn points. One of the points is of Toronto and the other Flint Hills chert.

Activities indicated by this assemblage include tool production and maintenance, game procurement and processing.

14JF420

The lithic assemblage from this site consists of ten formal stone tools and 491 pieces of debitage, including 7 utilized flakes. The debitage is 63.7% chips, 15.3% flakes, and 7.1% cores and tested pieces, with the remainder consisting of shatter. The material type of the debitage is 41.5% Toronto chert, 26.7% Flint Hills, 8.3% Sioux quartzite, 7.5% Plattsmouth, 6.1% unknown, 5.5% white chert (4.5% medium grained and 1.0% fine grained), 1.8% quartzite, 1.8% alluvial cherts and .6% Winterset chert. Heat modification was found on 30.1% of the debitage. Of the Toronto chert 24.5% was heat treated, Flint Hills 37.4%, and Plattsmouth 35.1%. All stages of lithic reduction are represented with 6 cores and 29 tested pieces, 14.9% decortification flakes, 27.5% secondary flakes and 57.6% tertiary flakes.

The site's formal tools consist of three projectile points, five bifaces, and two hammerstones. All the bifaces are small fragments, creating some difficulty in separating them into functional categories, although three are possibly knives and the remaining two preforms. There are two bifaces each of Toronto and Flints Hills chert, while the other biface is of medium grained white chert. One preform, of Flint Hills chert, has been heat treated. The projectile

points consist of a complete Plains Woodland Scallorn point, a whole, poorly made side-notched arrow point, of Flint Hills chert, and a fragmentary arrow point of Toronto chert. The hammerstones are Sioux quartzite and quartzite.

Activities at the site included chipped stone tool production and maintenance, animal procurement and processing.

Analysis and comparison of the lithic material recovered from the different test units excavated at the site, particularly test units on the site's two mounds, reveal similar lithic assemblages. With the exception of Toronto chert, material type of the lithic assemblage recovered from both mounds is identical. Flint Hills chert constitutes 24.5% of the assemblage at Mound A and 25.9% at Mound B, while Plattsmouth comprises 7.6% at Mound A and 8.9% at Mound B. Mound A's lithic material contained 49.4% Toronto chert compared to 38.4% at Mound B. The test unit (test unit 3) located between the two mounds has similar percentages of material type, Toronto chert 36.9%, Flint Hills 35.1%, and Plattsmouth 8.1%. Similar small variations in percentages of other lithic attributes were noted. Flakes comprise 13.0% of the debitage total of Mound A, while at Mound B they are 23.0%. Chips constitute 72.6% of the assemblage at A and 64.0% at Mound B. Mound B has a slightly higher percentage of decortification flakes than Mound A, and a correspondingly smaller percentage of tertiary flakes. For the last two categories mentioned Unit 3 is nearly identical in percentages to Mound A. It is not possible to conclusively determine on the basis of the lithic assemblages whether the mounds were occupied contemporaneously.

14JF421

The lithic assemblage of this site contains 11 formal tools and 218 pieces of debitage, including three utilized flakes. Chips constitute 60.1% of the debitage, flakes 18.3% and cores and tested pieces 3.7%. The debitage material is 39.0% Flint Hills chert, 33.9% Toronto chert, 11.0% unknown material, 5.5% Plattsmouth chert, 6.0% white chert (3.7% fine grained and 2.3% medium grained), 2.3% alluvial cherts, 1.8% Sioux quartzite, and .5% Winterset chert. Heat modification is evident on 36.7% of the debitage. Heat modification occurs on 32.9% of the Flint Hills chert, 32.4% of the Toronto chert and 16.7% of the Plattsmouth chert. Four cores and four tested pieces were found, indicating primary lithic reduction. The debitage is 15.6% decortification, 24.3% secondary, and 57.1% tertiary.

Formal stone tools consist of three bifaces, six projectile points and two hammerstones. All three bifaces are retouched pieces with no clear functional characteristics. Two are of Flint Hills chert and the other of medium

grained white chert. The projectile points consist of two Nebo Hill phase points, one of Toronto chert and the other Flint Hills chert; a Woodland Scallorn point of Flint Hills chert which has been heat treated; a corner-notched Woodland point of Flint Hills chert that has been heat treated; a side-notched Plains Village arrow point of Toronto chert; and a fragment of a parallel stemmed, probable Archaic point, of Flint Hills chert.

Site activities include chipped stone tool maintenance and production, animal procurement and processing.

14JF423

Six formal tools and 266 pieces of debitage, including four utilized flakes constitute the lithic assemblage. The debitage is comprised of 65.8% chips, 15.0% flakes, .4% cores and tested pieces and the remainder shatter and potlids. The debitage material is 83.1% Flint Hills chert, 6.4% Toronto chert, 4.9% fine grained white, 2.6% unknown, 1.1% alluvial cherts, 1.1% quartzite, .4% Plattsmouth chert, and .4% Sioux quartzite. Heat modification occurs on 50.4% of the debitage. Flint Hills chert was heat treated in 56.2% of the cases, while 17.6% of the Toronto chert was heat modified. Primary reduction material is relatively scarce; only one tested piece and no cores were recovered. The debitage is 4.2% decortification, 10.9% secondary, and 84.9% tertiary.

The formal tools consist of one scraper, one biface and four projectile points. The scraper is a heavily utilized side scraper of unknown material. The biface, probably a biface, is of Flint Hills chert. All four projectile points are small side-notched arrow points indicative of the Plains Village period. Only one of the points is complete. The points are of Flint Hills chert, three of which have been heat modified.

The high proportion of tertiary flakes suggests that tool maintenance and the final stages of tool production were common activities at the site. Hide preparation and animal procurement probably also occurred.

14JF447

One hundred twenty-seven pieces of debitage, including seven utilized flakes and 18 formal tools comprise this site's lithic assemblage. The debitage consists of 70.9% chips, 13.4% flakes, 2.4% cores and tested pieces with the balance consisting of shatter. Debitage material is 40.2% Flint Hills, 19.7% Toronto chert, 16.5% alluvial cherts, 10.2% unknown material, 9.4% Plattsmouth chert, 3.9% white chert (3.1% fine grained and .8% medium grained). Heat modification was noted on 30.7% of the debitage, 28.3% of the

Flint Hills chert and 25.9% of the Toronto chert. Although no cores and only three tested pieces were recovered, all other stages of lithic reduction are represented in the debitage, which consists of 20.2% decortification, 21.0% secondary and 58.9% tertiary.

The site's formal tools consist of five bifaces, ten projectile points, two hammerstones and one crude axe. All the bifaces are fragmentary. One is a preform made of Toronto chert. Another is a Flint Hills chert flake blank with bifacial retouch. The three remaining bifaces were probably used as knives, two of which have been utilized and one heat treated. Two of the knives are Flint Hills chert and the other is an alluvial chert. The projectile points show a wide range of temporal variability. Four are Nebo Hill lanceolate fragments. Two of the Nebo Hill points are made of Flint Hills chert, one is a basal fragment of Toronto chert which has been ground along the edge, and the remaining fragment is made from an unknown material which has been heat modified. Three projectile points are small thin fragments, from which their notching and overall morphology cannot be determined. One is an alluvial chert and the other two are of Flint Hills chert. Points include a small Plains Village side-notched arrow point of fine grained white chert, a large contracting stem base of Flint Hills chert, and a fragmentary corner-notched point, possibly a dart point. This last artifact is relatively thick and has only one notch, suggesting it may be a preform. The two hammerstones are of alluvial chert and quartzite, both of which have been heavily utilized. The axe has been slightly modified by chipping around the edge. One face is flat, the other convex, although neither appears to have been created by human modification. The convex face has a groove lightly ground across it. It is made of a dark green quartzite.

A number of activities occurred at the site. These include chipped stone tool maintenance and production and animal procurement. The axe probably indicates some sort of wood cutting activity.

14JF448/449

During the present investigation it was determined that 14JF448 and 14JF449 are mounds belonging to the same site. The lithic assemblage from Mound 14JF448 consists of four formal tools and 451 pieces of debitage, including five utilized pieces. Chips comprise 46.6% of the debitage, flakes 24.6% and cores and tested pieces 5.6% with the balance consisting of shatter and potlids. The debitage material is 35.3% Toronto chert, 33.3% Flint Hills chert, 8.6% Plattsmouth chert, 6.7% quartzite, 6.0% Sioux quartzite, 4.9% unknown, 3.3% white chert (2.4% medium grained and .9% fine grained), and 2.0% alluvial cherts. Evidence of heat modification is found on 27.5% of the debitage,

including 36.7% of the Flint Hills chert, 22.0% of the Toronto chert and 20.5% of the Plattsmouth chert. Primary reduction was a significant activity at the site as demonstrated by the presence of 17 cores and eight tested pieces. The debitage consists of 24.9% decortification, 27.5% secondary, and 47.7% tertiary material.

Formal stone tools from Mound 14JF448 consist of three projectile points and one hammerstone. The projectile points are all fragmentary. One is a thick, square-stemmed dart or knife base made of Plattsmouth chert. Another small fragment is probably a dart tip, made of heat treated Flint Hills chert. The last point is the base of a Scallorn point of Flint Hills chert. The hammerstone is of quartzite.

Activities carried out by occupants of this mound include chipped stone production and maintenance, and game procurement.

One formal tool and 208 pieces of debitage comprise the lithic assemblage from Mound 14JF449. The debitage is 52.4% chips, 23.1% flakes and 6.2% cores and tested pieces with the remainder consisting of shatter and potlids. The debitage material is 32.7% Toronto chert, 30.3% Flint Hills chert, 10.1% Plattsmouth, 9.1% Sioux quartzite, 6.2% unknown material, 4.8% alluvial cherts, 4.2% white chert (2.9% medium grained and 1.4% fine grained), 1.9% quartzite, and .5% Winterset chert. Heat modification was noted on 25.5% of the debitage. Toronto chert was heat treated 25.0% of the time, Flint Hills chert 27.0% and Plattsmouth chert 9.5%. There are ten cores and three tested pieces. The debitage is 24.6% decortification, 25.1% secondary and 50.3% tertiary material.

The formal tool is a broken biface, probably a knife, of heat treated Flint Hills chert.

Chipped stone tool production and maintenance occurred at this mound. The lack of additional data precludes the identification of other activities involving lithic artifacts.

Based on the assumption that these two mounds are part of the same site, a comparison of their lithic assemblages would help define their exact relationship. There are no significant differences in the lithic data. Individuals at these mounds were conducting similar activities and similar lithic technologies, supporting the notion that the mounds were occupied contemporaneously, or nearly so. Lithic material types recovered from the two mounds and the percentage of flaking stages are nearly identical. The small number of stone tools recovered makes a meaningful comparison of tool types impossible.

14JF450

One projectile point and 87 pieces of debitage comprise the lithic assemblage of this site. Chips comprise 52.9% of the debitage, flakes 17.2%, cores and tested pieces 3.4% and the rest consist of shatter and potlids. Debitage is 58.6% Plattsmouth chert, 14.9% Toronto chert, 12.6% Flint Hills chert, 6.8% white chert (5.7% fine grained and 1.1% medium grained), 3.4% alluvial cherts and 3.4% unknown material. Only 13.8% of the material has been heat modified. Signs of heat treatment were found on 81.8% of the Flint Hills chert, while only 7.7% of the Toronto chert was heat treated. There are two cores and one tested piece. The debitage consists of 11.9% decortification, 13.1% secondary and 75% tertiary material.

The projectile point is a complete Plains Woodland Scallorn point, made of Flint Hills chert.

Chipped stone tool production and maintenance occurred at the site. The inhabitants were also involved in game procurement. This site is unique in the study because of the large percentage of tertiary material.

14JF477

This site's lithic assemblage consists of 100 pieces of debitage. The debitage is 61.0% chips, 4.0% flakes and 35% shatter material. The material consists of 35% Toronto chert, 34% Plattsmouth, 16% Flint Hills, 12% white chert (6% fine grained and 6% medium grained), and 3% unknown material. Twenty percent of the lithic material was heat treated. Heat treatment was noted on 31.2% of the Flint Hills chert, 17.1% of the Toronto chert, and 17.6% of the Plattsmouth chert. The debitage is 16% decortification, 21% secondary, and 63% tertiary material.

Chipped stone tool production and maintenance took place at the site.

14JF482

Only three tertiary flakes were recovered at this site. They are of Plattsmouth chert, Toronto chert and Sioux quartzite. All have been heat modified.

Nothing substantive can be said about activities at the site based on this limited lithic assemblage.

14JF484

Six formal tools and 107 pieces of debitage, including two utilized flakes, constitute the site's lithic assemblage. The debitage is 50.5% chips, 21.5% flakes and

9.3% cores and tested pieces. Material type is 41.1% Flint Hills chert, 40.2% Toronto chert, 4.7% Sioux quartzite, 3.7% Plattsmouth, 2.8% white chert (1.9% medium grained and .9% fine grained), 2.8% unknown material, and .9% alluvial cherts. Heat modification occurs on 24.3% of the debitage. Evidence of heat modification was found on 27.9% of the Toronto chert, 22.7% of the Flint Hills chert and 25.0% of the Plattsmouth chert. All stages of lithic reduction were recovered at the site. Nine cores, one tested piece and 17.5% of the debitage represent the primary stage of reduction. In addition 28.9% of the debitage is secondary and 53.6% tertiary.

The site's formal tools include two bifaces, two projectile points and two hammerstones. One biface is a small fragment of white fine-grained chert. The other biface is a retouched chunk of Winterset chert. Both projectile points are small fragments with no apparent cultural-historical attributes. One is of a fine grained white chert and the other is a medium grained white chert; the latter has been heat treated. Both hammerstones are of quartzite.

Chipped stone tool maintenance and production occurred at the site. Animal procurement and possibly processing also occurred here.

Comparison and Summary

Lithic material was recovered from 16 of the sites in the Perry Lake Project Area. No lithic material was recovered from 14JF410. In her review and comparison of sites in the Clinton Lake Project Area, Ritterbush (1987:217) limited discussion to those sites which had more than 100 pieces of debitage. The discussion of Perry Lake materials will follow the same criterion. Although each tested site has many variables (size, location, number of test pits, depth of excavation, density of artifacts, etc.) the number of 100 pieces of debitage is imposed to enhance the interpretive value of assemblage comparisons. Sites with fewer than 100 pieces of debitage do not provide adequate samples from which meaningful conclusions can be drawn. Using this criterion the lithic data from 14JF103, 14JF105, 14JF409, 14JF417, 14JF450, 14JF477, 14JF482 have not been included in this discussion. Nine sites remain which have a sufficient number of lithic artifacts to permit discussion in this section.

One of the principle concerns of the lithic analysis was identification of raw material. A great deal of variety was noted in material types utilized at investigated sites. There are several factors which may influence or control choice of raw material, and some of these are considered. Site location was examined to ascertain if it had any influence on material selection. No correlation or pattern could be found with the Perry Lake data. This may be because

of the limited number of sites, or perhaps more importantly because of the homogeneous pattern of raw material distribution in the area. Much of the utilized lithic raw material can be obtained in the local stream drainages. The availability of material is remarkably homogeneous in the project area. Some material types such as the alluvial cherts and most of the Sioux and general quartzite appeared to have been entirely collected from drainages. The white and Winterset cherts, all which would have been brought into the area from the east, show the least amount of water wear. (See Appendix 3 for the relative frequencies of lithic raw material types for each tested site.)

By comparing temporal aspects of the lithic assemblages some variation in material utilization can be recognized. Although for the most part there is a broad similarity in material choice, there are a couple of notable exceptions, both Plains Village occupations. 14JF423 has a lithic assemblage which contains an unusually high percentage (83.1%) of Flint Hills chert, and a very low percentage (6.4%) of Toronto chert. This preference for lithic material from west of the project area suggests some sort of ties to the west. The other notable material variation is 14JF38, which contains a relatively high percentage (19.6%) of white and (14.0%) Plattsmouth cherts.

The other seven sites have Woodland components and a similar lithic assemblage. Toronto chert is the most frequently encountered material with assemblage percentages ranging from 42.4% at 14JF414 to a low of 19.7% at 14JF447. The next most utilized material was Flint Hills chert which had a high percentage of 40.2% at 14JF447 to a low of 26.7% at 14JF420. Plattsmouth chert was also commonly used; it had a high occurrence of 10.1% at 14JF449 and a low of 3.7% at 14JF484. White cherts had a bit more variation with a high of 11.5% at 14JF414 to a low of 2.8% at 14JF484.

A brief comparison of 14JF420 and 14JF448/449, the two Plains Woodland mound sites, shows some similarities in lithic assemblages. The use of heat treatment is nearly identical at the two sites. For instance, 70.0% of the artifacts at 14JF420 have no signs of heat treatment and at 14JF448/449, 73.0% have no signs. At 14JF420 Toronto chert comprises 41.5% of material used, while at 14JF448/449 it comprises 34.5% of the total. The largest difference between the two sites is in the debitage percentage. Chips comprise 62.5% of the debitage at 14JF420, while at 14JF448/449 only 48.4%. In contrast, 15.0% of the debitage is flakes at 14JF420, while 24.1% of the debitage at 14JF448/449 is flakes. These figures correlate with the slightly higher percentage of tertiary at 14JF420 (55.5%) compared to 14JF448/449 (46.7%). The significance of these variations is not clear. It may be a result of sampling biases because of the small samples. It may also reflect a fundamental

difference in the sites based on differences in tool maintenance and production or degree of sedentism practiced by the occupants. This trend should be explored in future study of Plains Woodland mound sites.

It is difficult to draw conclusions based on the material type of chipped stone tools by site, because none of the sites has an adequate number of tools from which to compare. However, in the project area, irrespective of the temporal factors, Flint Hills chert was preferred for chipped stone tools. Flint Hills chert was a prominent material type. However, it was even more important in finished tools, as 56.4% of the formal tools were made from this particular material. The next most preferred material for chipped stone tools was Toronto chert, from which 20.5% of the formal tools were fashioned. White cherts were used for 11.5% of the stone tools and the remaining materials were used in lesser amounts. Archaic dart points are almost exclusively Flint Hills chert, while later groups, though they still preferred Flint Hills chert, utilized a wider range of material in their formal tools.

Another attribute examined in the analysis is the amount of heat treatment exhibited by the recovered lithic artifacts. It is generally assumed that thermal treatment was applied to lithic material to improve its flaking qualities. Heat modification was fairly common for chipped stone artifacts recovered during the project. 14JF484 had the smallest percentage of treated material at 24.3%, while 14JF423 had the highest at 50.4%. The material most commonly treated was Flint Hills chert. The percentages of heat treating for this material range from 56.2% at 14JF423 to 22.7% at 14JF484. These two sites correspondingly have the highest and lowest percentage of heat modification in general. Toronto chert was also frequently heat treated, but to a somewhat lesser extent than Flint Hills chert. Toronto chert heat treatment percentages range from a high at 14JF38 of 43.2% to a low of 17.6% at 14JF423. An important note is that a great deal of Toronto chert shows edge burn, or minimal amount of heat modification. The three sites with the highest percentage of edge burn also have the highest percentage of Toronto chert with heat modification. The sites with lower percentages of edge burn also have lower percentages of heated Toronto chert. It is unclear whether this tendency means the chert does not heat evenly throughout, or that it is more easily scorched by accidental fire. Other materials were heat modified with regularity, but their small numbers in the recovered samples make them unsuitable for any quantitative comparison.

Chipped stone tools were heat modified 30.8% of the time. This percentage is roughly similar to stone debitage in general. Most of the heat modified chipped stone tools are of Flint Hills chert. Forty-one percent of the chipped

stone tools made of Flint Hills chert have been heat treated, with only a small portion of the remaining stone tools exhibiting evidence of such a production technique.

A final attribute examined was the amount of cortex remaining on debitage as an indicator of the stage of lithic reduction. All nine sites have evidence of the three stages of chipped stone reduction. In general there is a positive correlation between the percentage of chips and the percentage of tertiary flakes, which is expected. 14JF423 has only 4.2% decortification debitage, while there is 84.9% tertiary debitage. Correspondingly the site has a high percentage (65.8%) of chips. High levels of decortification flakes were noted at 14JF448 (24.9%) and 14JF449 (24.6%). Additionally these sites have the largest proportion of flakes: 42.6% at 14JF448 and 23.1% at 14JF449. No site has enough variation in flaking stage material to suggest that it had a specific function, i.e. quarry site, workshop, etc.

Activities that can be inferred at the different sites are usually limited to chipped stone tool maintenance and production and animal procurement and processing. However, scrapers and utilized flakes may also indicate woodworking and other manipulation of soft material, in addition to the processing of hides. No formal groundstone tools were recovered on the project, although the axe at 14JF447 did have some grinding modification.

In conclusion, the comparison of the lithic data from the Perry Project suggests a marked similarity among sites. This indicates their occupants had similar economic pursuits, in spite of their temporal differences. Material selection does apparently vary temporally, although it still appears to have been determined to a significant degree by the availability of river cobbles and gravels.

Chapter 8

CERAMIC ANALYSIS

Brad Logan and Michelle Dunlap

Introduction

Archaeological excavation and survey of 12 of the 17 sites tested during the Perry Lake Archaeological Project yielded 931 prehistoric sherds of which 22 are rim fragments (Table 8.1). While the ceramic assemblages from the tested sites do not provide sufficient information to address a variety of problems concerning prehistoric ceramic technology in the project area they are valuable for identifying the cultural affiliation(s) of the site occupants (Table 8.2). The main purpose of this ceramic report is to describe the assemblages as they pertain to this aspect of the prehistory of the study area and thus provide the basis for framing questions concerning the culture history of the project area, one of the research goals of the Perry Lake Archaeological Project (see chapter 1).

Table 8.1. Sherd Counts by Site and Provenience.

Site	Unit	Level	Analyzed	Unanalyzed
14JF38	--	Surface	0	2
14JF38	2	(0-10)	0	2
14JF38	2	(10-20)	0	2
14JF38	3	(0-10)	0	10
14JF38	3	(10-20)	0	3
14JF38	4	(0-10)	0	14
14JF38	5	(0-10)	0	7
14JF38	5	(10-20)	0	3
14JF38	6	(0-20)	0	8
Totals			0	51
14JF414	--	Surface	1(1 rim)	0
14JF414	4	(0-10)	0	2
14JF414	7	(10-20)	0	2
14JF414	7&8	(10-20)	0	1
14JF414	8	(10-20)	0	3
14JF414	7,8&9	(-----)	0	3
14JF414	9	(0-10)	0	1
14JF414	11	(0-20)	0	1
14JF414	12	(0-20)	0	1
Totals			1	14

Table 8.1. (cont').

Site	Unit	Level	Analyzed	Unanalyzed
14JF420	Test 3	Surface	1	0
14JF420	" 4	Surface	0	1
14JF420	" 6	Surface	1	0
14JF420	" 7	Surface	1	3
14JF420	" 9	Surface	0	2
14JF420	" 10	Surface	2	1
14JF420	" 11	Surface	0	2
14JF420	Mound A			
14JF420	1	(10-20)	2	22
14JF420	1	(20-30)	2	44
14JF420	1	(30-40)	2 (1 rim)	6
14JF420	1	(40-50)	4 (1 rim)	9
14JF420	1	50	2	0
14JF420	1	(50-60)	2	9
14JF420	1	(60-70)	0	1
14JF420	1	60	1	0
14JF420	Mound B			
14JF420	2	(0-10)	0	2
14JF420	2	(10-20)	4	19
14JF420	2	(20-30)	2	10
14JF420	2	(30-40)	4	8
14JF420	2	(40-50)	2 (1 rim)	23
14JF420	2	(54-60)	0	2
14JF420	2	(50-60)	8 (1 rim)	9
14JF420	2	(60-62)	1	2
14JF420	3	(0-10)	0	2
14JF420	3	(10-20)	0	28
14JF420	3	(20-30)	1	13
14JF420	3	(30-40)	2	2
Totals			44	220
14JF421	1	(0-10)	0	8
14JF421	1	(10-20)	1	0
14JF421	2	(0-10)	0	3
14JF421	2	(10-20)	2	1
14JF421	3	(10-20)	2	0
14JF421	4	(20-30)	1	0
Totals			6	12

Table 8.1. (cont').

Site	Unit	Level	Analyzed	Unanalyzed
14JF423	--	Surface	1 (rim)	0
14JF423	1	(0-10)	1	3
14JF423	1	(10-20)	0	1
14JF423	1	(20-30)	1	0
14JF423	2	(0-10)	1	7
14JF423	2	(10-20)	0	3
14JF423	2	(20-30)	0	5
14JF423	3	(0-10)	1	10
14JF423	3	(10-20)	1	7
14JF423	3	(20-30)	1	7
14JF423	3	(30-40)	2 (1 rim)	0
Totals			9	43
14JF447	--	Surface	2	0
14JF447	2	(0-10)	3	7
14JF447	2	(10-20)	1	5
14JF447	2	(20-30)	2 (1 rim)	0
14JF447	4	(0-10)	0	4
Totals			8	16
14JF448	1	Surface	1	0
14JF448	1	(0-10)	4 (1 rim)	9
14JF448	1	(10-20)	1	0
14JF448	1	(10-30)	17	58
14JF448	1	(30-40)	5	14
14JF448	1	(40-50)	17 (1 rim)	26
14JF448	1	(50-60)	10 (2 rims)	45
14JF448	2	(0-10)	5	12
14JF448	2	(10-20)	8 (1 rim)	7
14JF448	2	(20-30)	16 (3 rims)	52
14JF448	2	(30-40)	8 (1 rim)	7
14JF448	2	(40-50)	6	6
14JF448	2	(50-60)	10	27
Totals			108	263
14JF449	Core 2	(8-20)	1 (1 rim)	0
14JF449	1	(0-10)	6 (1 rim)	12
14JF449	1	(10-20)	5	10
14JF449	1	(20-30)	5	7
14JF449	1	(30-40)	8 (2 rims)	18
14JF449	1	35cm	1	0
14JF449	1	(40-50)	9	19
14JF449	1	(50-55)	2	2
Totals			37	68

Table 8.1. (cont').

Site	Unit	Level	Analyzed	Unanalyzed
14JF450	1	(0-10)	0	8
14JF450	2	(20-30)	1	0
14JF450	4	(0-10)	1	0
Totals			2	8
14JF477	--	Surface	1	0
14JF477	3	(0-10)	0	9
14JF477	4	(0-10)	0	2
Totals			1	11
14JF482	--	Surface	1	0
14JF482	Profile 1	---	0	1
14JF482	Profile 2	---	0	1
Totals			1	2
14JF484	--	Surface	3	3
Grand Totals			220	711

Table 8.2. Site Cultural Affiliation Based on Ceramic Artifacts.

Site Number	Suggested Affiliation
14JF38	?
14JF414	Plains Village; Plains Woodland
14JF420	Grasshopper Falls phase
14JF421	Plains Village (Pomona variant?)
14JF423	Plains Village (Pomona variant; Central Plains Tradition)
14JF447	Grasshopper Falls phase
14JF448	Grasshopper Falls phase
14JF449	Grasshopper Falls phase
14JF450	Grasshopper Falls phase*
14JF477	Grasshopper Falls phase*
14JF482	Grasshopper Falls phase?*
14JF484	Plains Woodland?

*Based on ceramics in the Reichart collection, KSHS.

The criterion used to decide if a sherd deserved analysis was its size, or surface area. To be examined both the exterior and the interior surfaces of the sherd had to be at least a two cm^2. This requirement was met by 220 sherds, 24% of the total collection. All rim sherds were examined regardless of size.

Eleven attributes were used in anaylzing the ceramic assemblages: temper, color of slip, color of exterior surface, color of interior surface, exterior surface treatment, interior surface treatment, body thickness, shoulder thickness, rim thickness, and rim height. All measurements are metric and all colors were determined by comparison with the Munsell Soil Color Chart (1975 edition). These attributes generally provide the means to identify the taxonomic affiliation of ceramic-age complexes in the Central Plains.

Discussion

The entire ceramic assemblage includes two wares representing two periods of prehistoric occupation of the study area. These wares are indicative of the Plains Woodland and Plains Village periods. For the most part ceramic artifacts of the former are identiable as Grasshopper Falls ware, diagnostic of the phase of that name (Reynolds 1979:70-71). Sherds of the Plains Village period are assignable to Pomona variant and Central Plains Tradition (i.e., Nebraska, Smoky Hill and Upper Republican phases) wares.

Plains Woodland Ware

Nine of the sites contain ceramic artifacts identified as Plains Woodland ware. Of these, four can be assigned to the Grasshopper Falls phase on the basis of sherds recovered during this project. The Grasshopper Falls phase is the only currently recognized complex of the Plains Woodland period in the study area. While the ceramic assemblages from five of the tested sites could only be assigned a more general culture-temporal affiliation on the basis of the ceramic samples recovered during our investigations, these are also probably referable to that phase. Such an assignment is supported in a few instances by larger samples of ceramics recovered during earlier surveys. For example, larger ceramic assemblages recovered by Milton Reichart from 14JF450 and 14JF477 and now curated at the Kansas State Historical Society have all the attributes of Grasshopper Falls ware, the diagnostic pottery of the phase (Reynolds 1979:70-71). Smaller samples of comparable pottery were also recovered by Reichart at 14JF410 and 14JF482 (see Figs. 6.4e and 6.53a,b).

Grasshopper Falls ware consists of medium to large jars with conical or sub-conical bases. They are tempered, often abundantly, with grit and/or sand. The exterior surface of the vessels is cordmarked or smoothed. The interior of the vessels is smoothed or occasionaly brushed horizontally, particularly around the neck. Rims are straight to slightly inverted and decoration is relatively rare. When present, decorative elements consist of oblique tool impressions outside the lip, oblique cord impressions on the lip,

exterior bosses on the neck, or holes below the lip. Reynolds (1979:71) suggests these vessels were used strictly for utilitarian purposes.

The ceramics in the Reichart collection (KSHS) from 14JF450 and 14JF477 fit well within the definition of Grasshopper Falls ware. Indeed, his collection from the former includes one of the most complete vessels of this ware yet found. Though as yet un-reconstructed, this vessel is a thick-walled elongated jar with the thickened base and overall conical shape so typical of Plains Woodland pottery. Some variety in rim profile, mouth diameter and exterior surface treatment is represented among the rim sherds in the collection from these adjacent sites. For example, rims range from constricted to flared, and mouth diameters range from about nine cm (Fig. 6.48e) to 32 cm (Fig. 6.48b) with an intermediate size of 18-20 cm (Figs. 6.48c, 6.51a). Exterior surfaces include both cordmarked and smoothed forms. Among the latter is the only example of a decorated sherd among either site assemblage, a rim with regularly spaced circular stick impressions at the base of the neck (Fig. 6.48e).

Four sites can be confidently assigned to the Grasshopper Falls phase on the basis of ceramics we recovered during this project. These are 14JF420, 14JF447, 14JF448 and 14JF449. The smallest analyzable assemblage among these sites is from 14JF447 and it consists of eight sherds. Sand temper occurs in seven of these and the eighth appears to lack any discernible tempering agent. Exterior surface color ranges from yellow (one) to brownish yellow (two), light yellowish brown (one), yellowish brown (three), and pale brown (one). The interior colors range from yellow (one) to pale brown (one), brown (one), dark brown (one), grayish brown (one), and dark grayish brown (three). Five of the sherds were smoothed on the exterior while the remaining three were partially smoothed. Body thickness ranges from six to 11 mm with a mean of eight mm. The single rim sherd (Fig. 6.40i) bears a flattened lip and lacks sufficient arc length to determine mouth diameter or rim height.

The other three sites assigned to the Grasshopper Falls phase on the basis of their recovered ceramic artifacts also share another characteristic, the presence of earth mounds. These features are suggested to indicate the remains of habitations or to reflect either prolonged site occupation or periodic reoccupation (see chapters 6 and 10). The relative abundance of ceramics from these sites as compared to the smaller samples from all other sites tested during the project seems to support such an interpretation.

The Quixote site (14JF420) is composed of two mounds interpreted as the remains of house structures and their associated activity areas (see chapter 6). Limited excavation of both and the area between them yielded a sample

of 44 analyzable sherds of Grasshopper Falls ware. The tempering agents used in these sherds include shell (one), grit (19), and sand (23). The exterior surface colors are brownish yellow (three), light brownish gray (one), light gray (one), dark gray (one), very dark gray (one), light yellowish brown (12), yellow brown (two), very pale brown (five), pale brown (11), brown (two), grayish brown (one) and dark grayish brown (one). The interior colors range from brownish yellow (three) to light gray (one), light brownish gray (one), gray to light gray (one), gray (three), dark gray (ten), very dark gray (one), light yellowish brown (five), very pale brown (five), pale brown (five), grayish brown (one) and dark grayish brown (six). The exterior surface treatment includes cordmarked (13), smoothed (12) and partially smoothed (18). Body thickness ranges from six to 13 mm with a mean of nine mm.

Rim sherds display variety comparable to those described above from 14JF450 and 14JF477 (Fig. 6.30-6.31). Among them are cordmarked, brushed and smoothed forms with flattened or rounded lips. Profiles range from constricted to straight to everted. Interior horizontal brushing is evident on one rim (Fig. 6.30b), others are smoothed in that aspect. Mouth diameter, measurable on one of these fragments (Fig. 6.30c), was as large as 26 cm.

Among the most interesting ceramic artifacts recovered at 14JF420 is a ceramic pipe stem found at a depth of 41 cm in Mound A (Fig. 6.31a). This find represents a new addition to our inventory of the Grasshopper Falls phase. Like the pottery of that complex, it is densely tempered with grit. Its color, excluding dark gray fire clouds, is dark yellowish brown. The bore hole enters the mouth symmetrically but is off-center at the broken end of the stem. Slight flaring of the stem at this end suggests it broke just at the point of inflection for the bowl. The soil within the bore, though saved for that purpose, has not yet undergone microscopic analysis for plant remains. Macroscopic inspection of this soil, however, has not revealed any carbonized material.

The Reichart site includes two mounds recorded separately as 14JF448 and 14JF449. Units excavated in both mounds contained large samples of Grasshopper Falls ware. There were 145 identifiable sherds associated with these sites, and the following characteristics identify them as belonging to that complex. The tempering agents include grit (99), sand (45), and shell (one). Exterior surface colors are yellow (nine), brownish yellow (two), light yellowish brown (21), yellowish brown (one), very pale brown (36), pale brown (21), brown (one), grayish brown (four), dark grayish brown (three), light brownish gray (11), light gray (17), light gray to gray (one), gray (six) and dark gray (six). Interior colors show less of a spectrum, they run from yellow (five) to brownish yellow (one), light yellowish

brown (11), very pale brown (27), pale brown (11), grayish brown (nine), dark grayish brown (three), light brownish gray (12), light gray (ten), light gray to gray (four), gray (19), dark gray (25), and very dark gray (four). The vast majority of these sherds are cordmarked or smoothed and a few were either partially smoothed or brushed. Body thickness ranges from five to 14 mm with a mean thickness of nine mm.

Rims represent the variety currently recognized for Grasshopper Falls ware. They include slightly constricted, straight and everted forms. One of the larger fragments, from a vessel with a mouth diameter of about 26 cm, bears a portion of a flared shoulder (Fig. 6.46c). Three sherds bear decorative treatments including oblique impressions near a thinned lip (Fig. 6.47b) and oval stick impressions just below the lip (Fig. 6.47c-d).

Plains Village Ware

Plains Village ware is distinguished from earlier Plains Woodland ceramics by the more eclectic variety of tempering agents, including shell, sherd, bone, grit and sand and by vessel forms that are globular and consist of bowls and jars with capacities generally smaller than Plains Woodland pottery. The more frequent occurrence of collared rims, loop or strap handles and the inclusion of sand or grit temper are distinctive hallmarks of the pottery of Central Plains Tradition complexes and serve to distinguish them from those of the Pomona variant (Wedel 1959; Witty 1967, 1978; Brown 1985). Pomona variant and Central Plains Tradition pottery are both characterized by exterior cordmarking. The prevalence of shell temper and smoothed exterior surfaces of Steed-Kisker vessles, as well as the frequent application of a slip and/or a variety of incised decorative motifs (chevrons, scrolls, etc.) are significata of that complex (Wedel 1943; Calabrese 1969; O'Brien 1978a, 1978b).

Only three of the tested sites have ceramic assemblages that fit the array of attributes described above. These are Senn's Hill (14JF414), 14JF421, and Bowies Branch (14JF423). Two of these, Senn's Hill and 14JF421, are adjacent upland sites with very small samples of Plains Village ware. Only a single sherd of this material, a small rim, was recovered at 14JF414. It is thin (four mm), contains bone temper and exhibits a smoothed, gray to light gray exterior surface. The interior surface is of identical treatment and color.

Only six of the 18 sherds from 14JF421 were of sufficient size for analysis and attributes of these are most comparable to Pomona ware. All are body fragments that bear cordmarked exterior surfaces and smoothed interior surfaces. Exterior colors, which can only be recorded on four of the specimens, are very pale brown (two), light brownish gray and

light yellow brown. Interior colors are brownish yellow (two) and light yellowish brown (two). Core color is gray in all cases. None of the sherds contains any readily discernible temper. One contains a bit of grit and another a piece of indurated clay. The others lack any visible aplastic materials. This attribute is particularly characteristic of Pomona ware (Witty 1967). Body thickness ranges from six to nine mm with a mean of eight mm.

The analyzable ceramic artifacts from the Bowies Branch site (14JF423) consist of nine sherds. Although small, the assemblage is characterized by intriguing variety in several respects, a variety supported by the larger sample collected by Milton Reichart (KSHS) and reviewed more cursorily for this analysis. The sample recovered during our project displays the following attributes. Temper includes sand (five) and shell (one) but was absent from two of the sherds. The exterior surface colors range from white (one) to yellow (one), brownish yellow (two), pale brown (one), grayish brown (one), and gray (one). The interior colors range from white (one) to yellow (one), brownish yellow (one), light gray (one), gray (two), and dark gray (one). Exterior surfaces are cordmarked (five) or smoothed (three). Body thickness ranges from five to seven mm with a mean of six mm.

Two rim sherds were recovered. One is straight, partially smoothed and exhibits no decorative treatment (Fig. 6.36e); the other is collared, cordmarked and bears oblique incisions across the lip (Fig. 6.36f). One of the rim sherds found by Reichart during an earlier survey of the site also exhibits a slight collar (Fig. 6.36a). Another from the same collection bears oblique incisions across a cordmarked exterior (Fig. 6.36c) and a third small fragment displays a flattened, slightly protruding lip (Fig. 6.36d). During a brief survey of 14JF463, a site just east of 14JF423 and opposite it from an intermittant stream, we recovered a single cordmarked and collared rim fragment (Fig. 6.36g), which suggests that site is of the same period of occupation.

The presence of vessels with collared rims at the Bowies Branch site was invoked in its initial assignment to the Central Plains Tradition (see chapter 6). While this certainly remains a possibility, we yet lack sufficient samples of ceramic material or other supportive data (e.g., structural evidence) to confirm this interpretation. It must be noted, however, that collared rims have been recorded at other sites in northeastern Kansas that have been assigned to the Pomona variant (Witty 1983). Brown (1985:144-145), in his exhaustive study of ceramic assemblages from Pomona sites, recorded only 12 instances of this attribute among the 587 rims he examined. All of these occurred at sites in the Delaware and Wakarusa River basins and were suggested to be a reflection of the influence of Central Plains Tradition

groups on the Pomona population in that area. The variability in the ceramic assemblage from the Bowies Branch site may provide answers to a number of current research problems concerning the relationship among contemporaneous Plains Village groups in the project area. These are discussed in more detail in chapter 10.

Conclusions

The ceramic assemblages from seven of the 17 tested sites could be assigned with varying degrees of confidence to one or both of two cultural-temporal periods, Plains Woodland and Plains Village. Four sites, 14JF420, 14JF447, 14JF448 and 14JF449, contained sufficient amounts of Grasshopper Falls ware for confident assignment to that phase of the Plains Woodland period. Three sites, 14JF414, 14JF421 and 14JF423, contained small samples of sherds characteristic of the Plains Village period. Only the last of these sites can be more than tentatively assigned to that period. Very small fragments of Plains Woodland pottery were recovered during excavation of a basin hearth at 14JF414, as well as from the floated fill of that feature, and these, together with a variety of lithic artifacts and a radiocarbon date, indicate the presence of such an earlier, ceramic-age occupation at Senn's Hill. Reichart (personal communication) has identified two distinct wares at 14JF421 only one of which is present in our collection. This assemblage has been tenatively identified as Pomona ware. Cursory review of ceramic material from 14JF450 and 14JF477 permits us to confirm the assignment of those sites to the Grasshopper Falls phase.

The abundance of ceramic artifacts recovered during limited excavation of three Plains Woodland mound sites points to their great research potential for delimiting a broader range of variabililty in Grasshopper Falls ware than is currently recognized and for achieving greater insight into the ceramic technology of that period. The presence of two distinct ceramic wares at the Bowies Branch site indicates the research potential that site maintains for understanding the relationship among the different populations they may represent.

Chapter 9

BIOLOGICAL ANALYSES

Mary Adair, Steven Bozarth and Brad Logan

Introduction:

This chapter consists of three sections devoted to the analysis of biological materials recovered during the Perry Lake Archaeological Project. The first two sections concern evidence of plants, specifically macrobotanical remains and opal phytoliths. The third section concerns faunal remains. Perhaps the most striking aspect of the biological assemblages from the sites investigated during this project is their paucity. While disappointing in the lack of insight this leaves us, especially with regard to our research goals of site function and settlement patterns, it is not surprising. It is generally the case that biological materials have not been well preserved at prehistoric sites throughout much of the eastern Central Plains and particularly in northeastern Kansas (cf. Logan 1985, 1987). A variety of taphonomic and cultural factors no doubt underlie this dismal fact. Soil chemistry, either high acidity or phosphate depletion, has been designated as the major culprit in poor faunal preservation (Wedel 1943:73; Artz 1983b). Undoubtedly the nature of the primary deposition of plant and animal remains has much to do with their chances of survival or disintegration. Animal bones or vegetal materials that have been burned, concentrated in a thick midden deposit or shielded in a trash-filled storage pit seem to survive whereas those left unburned or exposed on the ground without quick burial fall prey to natural forces of destruction. Given the limited area excavated during a testing project, the probability of encountering such features as storage pits or hearths is low, unless their presence is obvious. Groups that inhabited the study area throughout the prehistoric period were not characterized by high population densities or fully sedentary settlement patterns. Consequently, habitation sites rarely have well developed middens. More recent cultural forces of site disturbance, such as plowing and terracing, only enhance the attrition rate of biological materials.

Other than chance discovery of well preserved plant and animal remains archaeologists can rely on one technique that increases their ability to recover such material. Flotation of samples from test units or features in which good biological preservation is expected will yield more evidence than standard dry-screening methods. In the following discussion of macrobotanical and faunal remains by Mary Adair and Brad Logan respectively, the reader should note that it was this technique which provided nearly all of this evidence recovered at some of the investigated sites.

Steve Bozarth describes the results of his analysis of opal phytolith samples recovered from two sites of the Grasshopper Falls phase that contained habitation mounds. His research was conducted specifically to identify cultigens. While our knowledge about the practice of subsistence agriculture among Plains Village groups in the Central Plains is relatively well documented, that of similar practices during the earlier Plains Woodland period is poor. It was hoped that this form of analysis would provide a corroborative, or at least alternative, means of identifying cultigens to the more conventional methods based on macrofloral data.

MACROFLORAL REMAINS

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As part of the Perry Lake project recovery methods, extensive flotation was conducted to recover macrofloral remains. Macrofloral is a term used to refer to all plant remains visible to the naked eye and includes charred and fresh seeds, nutshell, wood charcoal and other plant parts. In this report, wood charcoal was not identified. Identification was limited to seeds, nutshells and plant parts.

Both light and heavy flotation samples were initially sorted for macrofloral remains with the use of a 10x power magnifying lamp. Sorted material was further analyzed using a binocular microscope at 10x-40x power. A comparative collection and seed identification manuals were consulted during the identification process when necessary. Samples from 14JF38, 14JF409, 14JF414, 14JF420 and 14JF448 were analyzed for macrofloral remains.

Samples from sites 14JF409, 14JF38 and 14JF420 did not yield any identifiable macrofloral remains. Six small fresh seeds were recovered from test unit 3 at 14JF38 but their fragmentary condition prevented any sound identification. Plant material was also observed in one sample from 14JF409, the Munker's Creek occupation. Again, however, the small fragmentary nature of this charred residue rendered it unidentifiable. Test units 1 and 2 from site 14JF448 yielded identifiable plant remains; however all of the remains were fresh. Two fragments of a grape (*Vitis* sp.) pit and two fragments of an unknown fruit section were recovered from test unit 1 at this site. From test unit 2, one fragment of an acorn (*Quercus* sp.) shell and two fragments of black walnut (*Juglans nigra*) shell were identified. All of these remains were recovered from shallow deposits and probably represent recent intrusions into the archaeological context.

Site 14JF414 yielded the most macrofloral remains, some of which appear to be associated with the prehistoric occupation. Level two (10-20cm) of test units 7 and 8 yielded 3 fresh Abutilon seeds, several fresh seed coatings and several fresh unidentifiable seed fragments. A total of 108 small charred nutshell fragments were also identified from these same excavation units. While most fragments are too small to identify positively, they are smooth surfaced and relatively thin. These characteristics compare favorably to hickory (Carya sp.) and oak (Quercus sp.), though hickory survives better due to its slightly thicker shell. At least ten of the fragments can be identified as black walnut (Juglans nigra). Both black walnut and hickory are native to the area of present day northeastern Kansas and are frequently found in archaeological deposits. Their presence at site 14JF414 within Feature 1 suggests that they were intentionally gathered by the prehistoric occupants as a food source. Shell fragments within the feature could be due to food processing techniques or cooking practices.

OPAL PHYTOLITH ANALYSIS FOR CULTIGEN IDENTIFICATION: THE QUIXOTE AND REICHART SITES

by

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Introduction

Growing plants absorb water containing dissloved silica. The dissolved silica (hydrated silica dioxide) eventually solidifies producing microscopic silicified plant cells, cell walls, and intercellular spaces. Silica bodies with characteristic shapes are called opal phytoliths. Phytolith is derived from the Greek works phyton, meaning plant, and lithos, meaning stone. Opal is the common name for hydrated silica dioxide. Phytoliths form in most plants and are produced in many shapes and sizes. Phytoliths are diagnostic when their shapes and/or sizes are specific to a particular taxon.

Many types of phytoliths are resistant to weathering and are preserved in sediment over long periods of time. Fossil phytoliths can be analyzed to reconstruct vegetative histories and identify certain cultivated plants in archaeological sites.

Phytolith identification of most cultigens (maize, beans, squash, pumpkins, gourds, sunflowers and marshelder) in prehistoric contexts depends largely on diagnostic phytoliths being formed in the seed or seed-bearing structures, as they are the parts of the cultigens taken to

habitation sites. Identification of tobacco would depend on diagnostic phytoliths being produced in the leaves and petioles (Bozarth 1986). Cultigen reference materials should always be from non-hybrid historic or traditional varieties.

Phytoliths are produced in the rind of selected varieties of squash and pumpkins (Cucurbita pepo and C.maxima) and domesticated gourds (Lagenaria siceraria). Phytoliths produced in the domesticated gourds are of a type that have little taxonomic value. However, spheroidal and hemispheroidal phytoliths with deeply scalloped surfaces of contiguous concavities appear to be diagnostic of selected varieties of squash and pumpkins (Bozarth 1986). Based on this and subsequent research, squash was identified in prehistoric sites in Nebraska and Arkansas (Bozarth 1985b; Fredlund and Bozarth 1986; Bozarth 1987b).

Distinctive hook-shaped silicified hairs are produced in pods of common beans, Phaseolus vulgaris (Bozarth 1986). Statistical analysis demonstrates that many of these phytoliths are significantly wider near the tip than similar phytoliths produced in plants native to the Central Great Plains. Bean phytoliths were identified at a protohistoric Wichita village in central Kansas based on this distinguishing characteristic (Bozarth 1988, 1989c).

Distinctive silicified multi-celled hair bases are produced in the disks of common sunflower (Helianthus annuus) and domesticated sunflower (H. annuus var. macrocarpa) and appear to be diagnostic of H. annuus (Bozarth 1986). Several phytoliths of this type were isolated from sediment samples collected in cultural features at a Central Plains Tradition village in northeastern Nebraska (Bozarth 1984).

Several types of phytoliths are produced in maize cobs. One of these is a silicified tracheid with spiral thickenings that range in width from 15-35 microns (Fredlund and Bozarth 1986). This type of phytolith was originally reported as a silicified ringed tracheid by Bozarth (1985a). This phytolith type is not produced in all maize varieties. Similar phytoliths are formed in a number of plant species native to the Great Plains but have a maximum width of 23 microns. A silicified tracheid with spiral thickenings and a width of 23 microns was isolated from a sediment sample collected from a prehistoric village in Arkansas and tentatively identified as maize (Fredlund and Bozarth 1986).

Another type of phytolith that is produced in maize cobs has concave to straight sides and narrow (at least three times as long as wide) tops and bottoms. This phytolith type appears to be diagnostic of maize (Bozarth 1987a). A more detailed description of this phytolith type based on analysis of a more extensive reference collection is as follows: the top is a least 3 times as long as wide (the top being the

narrower part of the phytolith), the top and bottom are non-sinuous, the ends of the bottom are round while the ends of the top many be round or slightly pointed, the top is flat or wavy while the bottom is flat, and top and bottom are the same length (i.e. non trapezoidal), their ends are perpendicular, and their sides are deeply concave (at least two microns in from an imaginary line connecting the ends. This phytolith type is unique to maize based on a study of 85 of the more common plant species native to the Central Plains. This phytolith type was not reported by Brown (1984) in his classification of phytoliths from 112 grass species common to central North America. Maize was identified at a protohistoric Wichita village in central Kansas based on the presence of this phytolith type isolated from a trash-filled storage pit. The identification of this phytolith as maize is supported by the absence of this type of phytolith in a control sample collected outside of any cultural features in the site at a depth that was ground surface during occupation. Most, if not all, of the phytoliths from the control sample are from the native vegetation growing in the study area when the site was occupied. The absence of maize-like phytoliths from sediment samples collected in five other archaeological features is further evidence that this type of phytolith was not produced by the native vegetation in the study area. These studies strongly indicate that this type of phytolith is diagnostic of maize since it is not produced in any of the other cultigens grown prehistorically in the central Plains (Bozarth 1989a).

Analysis of phytoliths from leaves of several varieties of maize (a Panicoid grass) and wild Panicoid grasses native to Ecuador indicated that certain cross-shaped phytoliths produced in maize were significantly larger than those produced in the wild grasses and could be identified on the basis of size (Pearsall 1978, 1982). However, research based on an extensive phytolith reference collection of Panamanian flora demonstrates that size alone is not a diagnostic characteristic that can be used to identify cross-shaped maize phytoliths but that cross-shaped phytoliths from maize leaves can be distinguished from those of wild grasses by combining size and three dimensional form (Piperno 1984). Numerous cross-shaped phytoliths typical of Panicoid grasses are produced in the husks of historic North America maize varieties. None appear to be unique to maize either in size and or shape when compared to cross-shaped phytoliths from certain native Panicoid grasses (Bozarth 1987a).

Piperno (1984) found a very low ratio of dumbbell to cross-shaped phytoliths in maize leaves when compared to most but not all of the reference grasses native to Panama. Bozarth (1987a) compared the ratio of these two types of phytoliths produced in husks of reference maize varieties to the native reference grasses and concluded that low ratios of dumbbell to cross-shaped phytoliths are not diagnostic of maize.

Methodology

Phytoliths were isolated from sediment samples collected in Mound A, T.U. 1, level 5 (40-50 cm b.d.) and Mound B, T.U. 2, level 5 (40-50 cm b.d.) at 14JF420; Mound 14JF448, T.U. 2, level 6 (50-60 cm b.d.) and Mound 14JF449, T.U. 1, level 4 (30-40 cm b.d.) at the Reichert site. Phytoliths were isolated from 5-gram samples using a procedure developed by Bozarth (1989b) based on heavy-liquid (Zinc Bromide) flotation and centrifugation.

Analysis

Numerous well preserved phytoliths were isolated from each of the samples. The vast majority were grass phytoliths. Phytoliths characteristic of the Pooid, Chloridoid, and Panicoid grass subfamilies were present. Other types not characteristic of grass were also present but in very low frequency. They may be indicators of deciduous woodlands. More than 35,000 phytoliths from each sample were scanned at 625x. No cultigen phytoliths were found. This negative evidence does not demonstrate that cultigens were not present at these sites since cultigen remains could have been in areas not sampled.

ANALYSIS OF FAUNAL REMAINS FROM EIGHT SITES IN THE PERRY LAKE PROJECT AREA

Brad Logan

Faunal remains are poorly represented in the assemblages acquired from the sites tested during the Perry Lake Archaeological Project. Indeed, only eight of the 17 sites yielded any such material and that in such meager amounts our interpretations of subsistence activities based on them must be considered tentative. The provenience of these faunal samples and their identification by element, condition and taxon are provided in Table 9.1. Nearly all of the bone and shell fragments of concern in this analysis were quite small and none provides any information about butchering practices or season of site occupation. Too frequently the condition of the remains and their lack of diagnostic landmarks preclude identification below the class level (e.g., fish, mammal) or permit more than assignment of the specimen to a general size range (e.g., small mammal). Some specimens, such as the snails from the historic component at 14JF414, prairie vole at 14JF414 and 14JF420, and pocket gopher at 14JF448, are obviously intrusive in their archaeological contexts. It should be noted that the quantity of animal remains from several of the sites would have been even smaller had flotation samples not been collected from them (i.e., 14JF409, 14JF414, 14JF420, and 14JF448). Indeed, without the application of that technique we would have no

evidence of fishing as one of the subsistence pursuits of the Plains Woodland populations in the study area. The following discussion is temporally oriented and focuses on sites with Archaic and Plains Woodland components.

Table 9.1. Faunal Remains from Eight Sites in the Perry Lake Project Area.

Site No.	Unit No.	Level No.	Depth(cm)	Description
14JF38	3	2	10-20	1 burned long bone fragment-medium mammal?
14JF409	Cut-bank	-	Surface	1 carbonate encrusted prox. right metacarpal-*Odocoileus virginianus*
	Cut-bank Profile 1	- Feature 2	Surface	14 unid. fragments 1 vial unid. frags. from light fraction
14JF414	7-9	Feature 1		Inc. among 550 very small frags. from lt. fraction: 10+ unburned fish bone fragments 1 burned fish bone frag 2 burned fish vertebra, small sunfish-size 1 unburned fish vert., small sunfish-size 3 fish scale fragments 2 molars microtine rodent (cf. *Microtus ochrogaster*) 1 molar sciurid rodent 2 molars *Sylvilagus floridanus* 1 prox. radius, cf. *Mustela sp.*
	10	2	10-20	6 snails-*Anguispira alternata* 1 right pectoral spine-*Ictalurus* sp. 1 marginal turtle plastron 1 lateral turtle plastron 1 right calcaneum *Sylvilagus floridanus* 1 unid.long bone frag., large mammal 3 unid. mammal bone fr.

Table 9.1 (cont.)

Site No.	Unit No.	Level No.	Depth(cm)	Description
14JF414	10	3	20-30	1 snail-*Anguispira alternata* 1 left mandible & teeth *Sylvilagus floridanus* 1 distal left radius-*Sylvilagus floridanus* 2 unid. mammal bone fr.
	10	4	30-40	4 snails-*Anguispira alternata* 1 snail - unid. 1 right mandible frag.-*Sylvilagus floridanus* 1 saw-cut long bone shaft frag., med-large mammal 1 distal left ulna, small bird 3 unid. long bone frag. medium mammal
	11	1	0-20	1 unid. mammal bone
	12	1	0-20	3 unid. mammal bone
14JF420	Shovel Test	9		1 mussel shell fragment
	1	3	20-30	1 unid. burned bone fr.
	1	5	40-50	1 poorly preserved cancellous bone, med-large mammal 1 long bone shaft frag. mammal 1 distal phalange frag. small rodent 49 unid. bone frags., most burned
	1	6	50-60	2 unid. burned bone 1 unid. unburned bone 1 podial frag., medium mammal
	1	6	50-60	From light fraction of flotation sample, SW corner: 1 vial uncounted small unidentifiable frags. 1 mussel shell frag. 1 fish vertebra - sun-fish size 1 fish scale fragment 1 lower M3, *Microtus ochrogaster* 1 premolar crown frag., cf. *Canis*

Table 9.1 (cont.)

Site No.	Unit No.	Level No.	Depth(cm)	Description
14JF420	1	7	60-70	1 left(?) femur shaft frag. (dorsal surface at prox. foramen), *Odocoileus virginianus*
	2	2	10-20	3 unid. bone fragments 1 unid. burned bone fr.
	2	3	20-30	1 unid. burned bone fr.
	2	4	30-40	1 prox. metapodial fr., *Sylvilagus floridanus* 3 small mammal teeth frags., cf. *Sylvilagus* 1 unid. bone, medium-large mammal 4 unid. burned bone frags., mammal 1 unid. unburned bone, mammal
	2	5	40-50	1 right mandible frag. with M1-M3, *Castor canadensis* 5 unid. mammal bone fr. 2 unid. burned mammal bone frags. From light fraction of flotation sample: 1 #2 phalange, *Sylvilagus floridanus* 83 unid. frags., most burned
	2	6	50-60	1 frag. very worn upper P3(?), *Odocoileus virginianus* 1 frag. long bone shaft medium-large mammal 6 frags. long bone shaft, med-large mammal 1 burned long bone shaft frag., small or medium mammal 1 complete metapodial, *Sylvilagus floridanus* 1 prox. rib frag., small mammal 1 incisor, small rodent 1 metapodial fragment, turtle? 6 unid. burned bone fragments, mammal 8 unid. bone frags., mammal

Table 9.1 (cont.)

Site No.	Unit No.	Level No.	Depth(cm)	Description
	2	6	50-60	From light fraction of flotation sample: 55 unid. bone frags., most burned
	2	6	54-60	From light fraction of flotation sample: 1 molar fragment, small rodent 1 fish scale fragment ca. 70 unid. fragments, burned and unburned
	2	7	60-62	1 burned bone frag., mammal
	3	3	20-30	3 unid. burned bone fragments, mammal
	3	4	30-40	1 unid. burned bone frag., medium mammal
14JF421	3	2	10-20	1 unid. burned long bone fr., med. mammal?
14JF423	1	1	0-10	1 unid. burned bone frag., mammal?
	1	2	10-20	1 unid. burned bone frag., mammal
	3	1	0-10	1 unid. burned bone frag., mammal
	3	2	10-20	7 burned frags., prob. same metapodial shaft, dorsal face, medium mammal
	3	3	20-30	1 burned metatarsal fr. dorsal face, probably _Odocoileus virginianus_
14JF448	1	1	0-10	2 unid. burned bone fr. mammal 2 unid. unburned bone frags., mammal
	1	2-3	10-30	8 unid. burned long bone shaft fragments, medium-large mammal
	1	4	30-40	3 frags., cervid molar, prob. _Odocoileus virginianus_ 1 unid. burned bone fr. small or medium mammal 2 unid. unburned bone frags., mammal
	1	5	40-50	9 unid. bone fragments

Table 9.1 (cont.)

Site No.	Unit No.	Level No.	Depth(cm)	Description
	1	6	50-60	1 right mandible frag, rostrum, 4 incisors, 9 molars & premolars of one _Geomys bursarius_ 1 incisor fragment, _Sciurus_ sp. 1 unid. burned bone frag., mammal
	1	6	50-60	From light fraction of flotation sample: 2 fish vertebra-sunfish size 2 fish scale fragments 1 turtle plastron frag. ca. 80 unid. burned bone fragments
	2	2	10-20	1 burned vertebra (?) frag., small or medium mammal 1 unid. bone fragment
	2	2-3	10-30	1 vial (30+) unid. frags., one bone? medium-large mammal
	2	4	30-40	1 unid. burned bone fr.
	2	Feature 1		From light fraction of flotation sample: 66 unid. bone frags., most burned
14JF449	1	4	30-40	8 unid. burned bone fr. medium mammal?
	1	5	40-50	1 unid. bone fragment
	1	6	50-55	1 unid. burned bone fr.

small mammal: rodent size medium mammal: canid size medium-large mammal: deer size large mammal: elk or bison size

Archaic

During his earlier surveys and test excavations of the buried Archaic components at the Cut-Bank site (14JF409), Milton Reichart recovered several bone fragments in that area now assigned to the Early Archaic period (i.e., the component south of the disconformity, see chapter 6). These include a few elements of white-tail deer (_Odocoileus virginianus_) and bison (_Bison_ sp.), all of which are encrusted with calcium carbonate. During our investigations we also recovered a few such encrusted bones from the surface of the cut-bank a few meters south of our Profile 3 and at a slightly lower depth

than Feature 1 (which provided a radiocarbon date of 8220±350 B.P.). One of these is identified as the proximal metacarpal of a deer (Table 9.1).

The presence of both deer and bison in this component indicates both played a role in the hunting practices of the people that inhabited the study area at a time of markedly greater aridity than today (i.e., the Altithermal, see chapter 2). While we know that later groups also depended to some extent on both of these animals, Late Holocene hunting strategies in northeastern Kansas generally emphasized woodland and edge game animals, primarily deer (e.g., Wedel 1959; Johnson 1972; Adair 1977; Reynolds 1979:73; see below). Bison, while present throughout the Central Plains, were more densely distributed in the short grass and mixed grass regions west of the tallgrass prairies and prairie-woodland ecotone of the lower Kansas River basin. However, the increased aridity and consequent invasion of the woodland community by grasslands during the Altithermal would have affected the distribution of both deer and bison. The size of the local population of deer may have decreased (although the remaining population may also have become more concentrated and, perhaps, more easily hunted). The number of available bison, conversely, may well have increased. The effect of these hypothetical changes on the subsistence practices of Archaic groups throughout much of the Central Plains remains poorly understood.

Data from Late Archaic sites west of the Delaware River basin indicate the groups in that part of the Central Plains practiced a generalized subsistence economy based on the procurement of a broad spectrum of wild plants and animals. However, the faunal assemblages from three distinct components at the Synder site in the El Dorado Project Area of south central Kansas are consistently dominated by bison (Grosser 1977). This pattern also appears throughout the Late Archaic levels at the Coffey site in the Tuttle Creek Project Area in north central Kansas (Schmits 1978). Interestingly, evidence of bison is entirely lacking in the faunal material from the Late Archaic component at the William Young site in the Council Grove Lake Project Area, which is midway between the former two project areas (Witty 1982b:182-186). At that site the dominant animal contributer to the diet was antelope, another inhabitant of the grassland community.

While the Archaic components at these sites are more contemporary with the Munkers Creek component at 14JF409 (from which we have no faunal material) than the earlier occupation discussed here, they date to the later years of the Altithermal and provide the basis for interpretation of hunting practices during that climatic episode in general. In the light of the data from these sites and the small sample of material from the Cut-Bank site we can hypothesize

a generalized hunting and gathering economy for the Archaic groups that ranged the Delaware River basin and suggest that bison was the major factor in it. Such an hypothesis can be tested with more adequate samples of faunal material from the Cut-Bank site following future investigation (see chapter 10).

Plains Woodland

The most abundant faunal assemblages considered here are from three sites assigned to the Grasshopper Falls phase of the Plains Woodland period, the Senn's Hill (14JF414), Quixote (14JF420) and Reichart (14JF448/449) sites. Again, the relative abundance of animal remains from these sites can be attributed to some extent to the more extensive use of flotation sampling during our investigation of them. Only additional excavation can determine if this quantity is also a reflection of greater sedentism on the part of Plains Woodland groups as compared to earlier Archaic mobility.

Despite the small size of these assemblages they display considerable variety and suggest a generalized hunting and gathering economy was maintained in the study area during this period. Of note, however, is the lack of any evidence of bison procurement or dependence on any game animals of the prairie habitat. Only animals of the forest and riverine environments, including deer, beaver, cottontail, fish and mussels, are represented. More poorly represented are unspecified animals whose habitat preferences cannot be determined (e.g., turtle, canid and mustelid).

This variety of animals is broader than those of assemblages from other sites of the Grasshopper Falls phase in the Delaware River basin. In particular, the fish and mussel remains, albiet scantily represented, have not been previously documented and indicate greater reliance on aquatic foods than heretofore recognized. Faunal material was recovered from two of the three type sites of the phase (Reynolds 1979:49, 64) and from a more recently excavated two component site north of the Perry Lake Project Area (Williams 1986:49). Excavation of the Anderson site (14JF331) yielded only 15 large and 19 small bone fragments. Among these are identified remains of deer, possibly beaver, and a small rodent. The Teaford site (14JF333) assemblage contains a single fragment of a bison tooth and five small unidentified bones. Material from the Grasshopper Falls phase component at 14AT2 consists of two rodent bones and a single element of elk. Taken as a whole, the faunal evidence from all sites of this phase suggests a food economy oriented toward animals of the woodland-riverine environment. Such a pattern also prevailed among the earlier Woodland populations (i.e., the Hopewell) in the adjacent Kansas City locality (Johnson 1972; Adair 1977). Given more extensive faunal and floral data from sites such as Senn's Hill, Quixote and Reichart,

comparison with the well documented subsistence practices of the Kansas City Hopewell might demonstrate that later Plains Woodland populations in northeastern Kansas maintained the "primary forest efficiency" form of hunting and gathering characteristic of that culture (Caldwell 1958; Johnson 1976; Reynolds 1979).

Conclusion

Faunal evidence from some of the sites tested during the project provides a tantalizing glimpse of food procurement practices during the Archaic and Plains Woodland periods in the Delaware River basin. This material is sufficient to indicate that more extensive investigations of the buried components at the Cut-Bank site, an upland campsite of the Grasshopper Falls phase (Senn's Hill), and lowland mound sites of that phase will probably provide data more adequate to gauge the effects of environmental change and the influence of habitat preferences on local prehistoric populations. Such data can be employed to test hypotheses about the mobility and generalized economy of Archaic groups during the Altithermal and the more sedentary, forest-riverine oriented economy of Plains Woodland populations.

Chapter 10

SITE EVALUATIONS, RESEARCH GOALS, AND RECOMMENDATIONS

Brad Logan

Introduction

As stated in the first chapter of this report, the purpose of the Perry Lake archaeological investigation was to evaluate the data from 17 archaeological sites in terms of their potential eligibility for the National Register of Historic Places (NHPA). Though the National Historic Preservation Act of 1966 (Public Law 89-665) does not mandate preservation of such sites, placement of sites located on Federal lands on the National Register requires that they be given extra consideration for protection from harmful impacts that would adversely affect their potential for providing answers to important questions concerning the human prehistory or history of the United States.

The NHPA created the National Register of Historic Places as a list of properties "significant in American history, architecture, archaeology, and culture" (Sec. 101 (a)(1)). Criteria for evaluation and determination of eligibility for nomination to the National Register of Historic Places are set forth in 36 CFR60.6 (a):

> The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and
>
> a) That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> b) That are associated with the lives of persons significant in our past; or
>
> c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> d) That have yielded, or may be likely to yield, information important in prehistory or history.

Executive Order 11593, Section 110 of the National Historic Preservation Act of 1966, as amended, also requires

federal agencies to identify historic properties under their control or jurisdiction that might qualify for the National Register.

In accordance with the above cultural resource management regulations, federal agencies are required to determine the National Register eligibility of archaeological resources under their control. This is accomplished by assessing information and recommendations provided by archaeologists. Raab and Klinger (1977:632) suggest that "the best approach to assessing archaeological signficance is in relation to explicit, problem-oriented research designs". Yet no research design can begin to cover the myriad problems that are answerable with archaeological data. Raab and Klinger (1977:632) are aware of the limitations of any particular research design. They point out that "if the archaeological record can provide a broad range of useful information, then it follows that there is no portion of it that is not significant to some range of research questions". Sharrock and Grayson (1979:327), in a comment on the article by Raab and Klinger, argue that determinations of site significance, or insignficance, based on tested hypotheses of an explicit research design may not be sufficient from the perspective of federal agents who have the ultimate responsibility for judging a site's eligibility for placement on the National Register. They agree that although significance determined in this way is "an excellent reason to ascribe significance in the National Register sense", the opposite may not necessarily be true. Just because an archaeological resource is found to be insignificant in terms of a current research design, it does not necessarily follow that the site is, in fact, insignificant. "The 'significance' of a site is clearly subject to change through time, increasing or decreasing as both knowledge and research orientation change" (Sharrock and Grayson 1979:327).

The essence of the dialogue between these two parties is that one (Raab and Klinger) believes the guidelines established for assessment of eligibility for the National Register are so broad they are of little use to archaeologists, while the other believes such breadth is necessary in order to guarantee that no site with some research potential is lost. This problem of potential significance, however, is anticipated in the National Register criteria. Archaeological resources are significant when they "have yielded, or may be likely to yield, information important in prehistory or history" (36CFR60.6). As a result, federal agencies bear the burden of proving that sites within their domain are neither significant or potentially significant. As stated earlier, this is accomplished by acting upon information and recommendations provided by the contracting archaeologist. "The importance of the contracting archaeologist's assessments of significance cannot be overemphasized" (Klinger and Raab 1980:556).

Once a site has been determined not to be significant, it is excluded from further federally funded research and does not receive protective managment consideration. Therefore, it is important that the potential significance of an archaeological resource be carefully considered. The full archaeological potential of a site may be difficult to realize if its significance is poorly documented.

Glassow (1977) outlines five main properties of archaeological resources that should be used to determine potential significance. These are variety, quantity, clarity, site integrity, and environmental context. For variety, it is ideal to preserve representative forms of all types of archaeological resources within a defined region. This includes isolated occurrences as well as complex sites. For quantity, it is ideal to preserve representative samples of the variability in site frequencies within a defined region. For clarity, it is ideal to preserve representative samples of the range in which sites occur in the natural environment, such as stratified sites and non-stratified sites of the same cultural complex within a defined region. Site integrity concerns the degree of preservation of a cultural resource. Finally, for environmental context, it is ideal to preserve representative samples of sites belonging to the same cultural complex that occur in varied natural environments, such as riverine, upland, grassland, and forested regions.

Stuart and Gauthier (1981) have synthesized the arguments for particular criteria that should be considered for determination of significance by various authors. They propose two major perspectives, or models, for determination of significance: 1) resource model of significance and 2) research model of significance. The resource model is primarily a managerial device, while the research model concerns questions of current archaeological research.

Stuart and Gauthier (1981:352) define the resource model of significance as being a map of the resource areas within defined entities, where the entities are arbitrarily defined and may consist of levels or periods of time, physiographic zones, soil types, etc. The main criteria for the arbitrarily defined entities is that they be consistent in the manner in which they are used. The arbitrary entities defined (e.g., periods of time, land forms, etc.) are then used to construct a grid. Known sites are organized within the grid according to the way in which they fall within any one of the entities. In this manner, it is possible to evaluate the sites according to their frequency or rarity and to recommend preservation or destruction with or without investigations. A site type that is very rare within the boundary of a project area may be common elsewhere; however, the defined project area under study is subject to known conditions that make it possible to manage the sites within that project area or universe, but not elsewhere. The

resource model is simplistic and does not address itself to questions of archaeological concern, but its advantage is that as sites are destroyed within a project region, there is a corresponding increase in the value of the remaining sites.

The research model of significance (Stuart and Gauthier 1981:353) is theoretical in orientation, with the point of reference being the research questions. In this model, site values rise and fall as questions are asked and answered. The frequency of sites of any given type is not necessarily considered. In the resource model, effects of the project area or universe define significance, while for the research model, the research questions define the values for significance. The research model is also arbitrary in the sense that no criteria are made for who asks the research questions and what constitutes valid research questions. In summary, "the quality of significance in archaeology is a relationship between the physical characteristics of sites and the state of knowledge about sites" (Stuart and Gauthier 1981:353).

The articulation of the resource and research models for determining significance allows for a comprehensive treatment of all cultural resources. Because both models address management and research issues, it has been recommended in the Kansas State Archaeological Preservation Plan (Brown and Simmons 1984:6-12) and other Kansas management plans (Adair et al. 1984:151) that they be considered in formulating recommendations for the management of cultural resources in Kansas. These models were adopted in the following evaluation of the sites investigated during the Perry Lake archaeological study.

Site Evaluations

Seventeen sites were investigated during the project. Table 10.1 presents summary data on each of these sites in terms of work done and significance evaluation. The juxtaposition of site significance with information on work performed is not meant to imply that there is a correlation between these data, rather the tabulation is simply the easiest way to present these important facts in one place. Five of the tested sites are recommended for consideration for placement on the National Register of Historic Places. Suggested research goals for archaeologists who might investigate these sites are discussed in a later section of this chapter. Twelve sites are not considered eligible for the National Register. The criteria used to determine the eligibility or ineligiblity of all investigated sites are described below.

Twelve sites are not recommended for National Register consideration. These sites lack either one or more of the following criteria necessary for recommendation: sufficient quantity of cultural material; sufficient variety of

Table 10.1. Sites Investigated During the Perry Lake Archaeological Project: Work Performed and Evaluations

Site No.	PA	ST	TU	GC	BT	BP	SB/SI	SE
14JF38	3	0	6	0	0	0	Yes	-
14JF103	0	0	8	0	0	0	No	-
14JF105	5	0	4	0	5	0	No	-
14JF409	0	9	2	0	2	3	Yes	+
14JF410	0	0	0	0	1	2	Yes	-
14JF414	25	0	14	0	0	0	No	-
14JF417	7	0	5	1	0	0	No	-
14JF420	0	16	3	0	0	0	Yes	+
14JF421	4	0	4	0	0	0	No	-
14JF423	1	0	3	0	0	0	No	+
14JF447	27	0	4	0	0	0	No	-
14JF448	0	0	2	1	0	0	No	+
14JF449	0	0	1	2	0	0	No	+
14JF450	0	10	4	0	0	0	Yes	-
14JF477	1	20	4	0	0	0	Yes	-
14JF482	4	0	0	0	1	3	Yes	-
14JF484	26	0	3	1	0	0	No	-

PA= plotted artifact ST= shovel test TU= test unit
GC= Giddings core BT= backhoe trench BP= bank profile
SB/SI= stream bank/shoreline inspection SE= site evaluation (+ significant; - not significant)

cultural material; and, sufficient depth and integrity of cultural deposits (see site recommendations in chapter 6). The negative evaluation of most of these sites stems from their lack of depth. It is too often the case in the Perry Lake area that sites contain shallow cultural deposits that have been vulnerable to plowing. This proved to be the case at 14JF103, 14JF105, 14JF414, 14JF417, 14JF421, 14JF447, and 14JF484. These sites occur on uplands or high terraces and their cultural horizons are limited to thin, agriculturally disturbed residual soils formed from bedrock or glacial deposits. When some artifacts were encountered below the Ap horizon at these sites their presence was invariably attributable to downward movement resulting from rodent activity or vertical translocation via dessication cracks. Examples of the latter phenomena were especially prevalent at Senn's Hill (14JF414), where cracks over one meter in depth were measured during our investigations (the summer drought of 1988). Despite the presence of a partially intact basin hearth at this site, extensive testing of its prehistoric and historic components demonstrates these have been largely

destroyed by plowing and terracing throughout the site area and to a more limited extent by the razing of an historic structure(s) in its southern portion.

Sites 14JF38, 14JF450 and 14JF477 are located on the shore of Perry Lake and have been severely impacted by erosive wave action. Scouring has deflated the soil that contained their cultural deposits and exposed them to periodic (and apparently quite thorough) surveys by artifact collectors. Moreover, at 14JF38 the surviving prehistoric component has been, and continues to be, impacted by those who use the campground at this site for recreational activities.

No evidence of the buried cultural material sampled by Reichart was found during our investigation of 14JF410 despite thorough bank inspection, profiling, and backhoe excavation. This site has apparently proven even more vulnerable to lateral erosion from the Delaware River than 14JF409, which is located a short distance upstream. Buried artifacts and areas of burned earth were discovered at 14JF482 in bank exposures, profiles and a backhoe trench. However, the quality and paucity of this material precludes a determination of significance.

Our investigations in the Perry Lake Project Area have demonstrated that five of the tested sites contain cultural deposits of significant research potential. These sites are: Cut-Bank (14JF409), Quixote (14JF420), Reichart (14JF448 and 14JF449), and Bowies Branch (14JF423).

The Cut-Bank site contains buried components, which date to the Archaic period and which retain potentially significant deposits that may shed much needed light on this poorly known period of prehistory in the region. At the present time, no site of the Archaic period in northeastern Kansas has been systematically investigated. The radiocarbon dates from hearth features at the Cut-Bank site are the oldest from the Perry Lake Project Area, and one of them is currently the oldest absolute date from any archaeological site in the lower Kansas River basin. Investigation of the buried Archaic components promises to provide us with basic information about this prehistoric period in the project area, as well as valuable information about human adaptations in the Central Plains in general during the Altithermal, a climatic episode characterised by significantly drier conditions than those prevalent during the past 5,000 years.

The Quixote and Reichart sites have earth mounds with deep cultural deposits of the Grasshopper Falls phase that have never been subjected to agricultural disturbance. At the present time, no other undisturbed sites of this complex have been recorded, let alone excavated. Our current

understanding of the Grasshopper Falls phase is derived from sites that had been subject to plowing prior to their excavation with consequent diminishment of their research value. Moreover, no site of this phase has yet been placed on the National Register. Thus, the Quixote and Reichart sites will serve as ideal representatives of the kind of habitations occupied by the prehistoric peoples of northeastern Kansas during the Plains Woodland period.

The Bowies Branch site contains intact cultural deposits, including evidence of a house structure, of the Plains Village period. Though partially disturbed by agriculture, the site retains sufficient integrity for NRHP consideration. Moreover, the association of ceramic wares indicative of different archaeological complexes at the Bowies Branch site promises to yield valuable information concerning the relationship among different Plains Village populations in northeastern Kansas.

These sites are considered eligible for the National Register of Historic Places. Their potential for providing us with a greater understanding of the prehistory of the Perry Lake Project Area is great. With regard to both the resource and research models discussed above, they qualify for placement on the National Register. At the present time, the status of our understanding of <u>all</u> prehistoric periods in northeastern Kansas is such that we cannot afford to lose from these sites the information they contain about past human adaptations in that region and the processes that brought about their change through time. In short, the potential research questions about the prehistoric period in that portion of the Central Plains are wide open, because our current answers are so few. In turn, the resource base for addressing these questions, a few of which are discussed below, has been substantially disturbed by natural processes of erosion and modern agricultural practices. Thus, the five sites considered eligible for the NRHP must be perceived as rare and vulnerable resources that possess significant potential for providing the answers to a wide array of research problems. These sites are discussed below in chronological order with reference to their temporal placement and in the context of the research goals outlined in chapter 1. Specific research problems are outlined for archaeologists who may have the opportunity to investigate them in the future.

Research Goals

<u>Archaic</u>

The Cut-Bank site (14JF409) is located on and beneath an alluvial terrace that has been and remains subject to lateral erosion by the Delaware River. It includes a surface component and two distinguishable buried components. The

surface component, now located within a small area of brush and timber, had been plowed prior to the opening of Perry Lake in the late 1960s. Our test excavations demonstrated that this component has been thoroughly disturbed by this cultivation. Testing yielded only a sparse amount of temporally undiagnostic lithic debris. Previous surveys of this component were conducted on a number of occasions when it was still in cultivation by Milton Reichart, an avid avocational archaeologist from Valley Falls. His collection, which he has donated to the Kansas State Historical Society, includes several chipped-stone and groundstone tools that indicate either a Late Arhaic and/or a Woodland occupation. The surface finds reflect a variety of activities, including hunting and game preparation, gathering and plant food processing, woodworking, and chipped-stone tool manufacture and maintenance. Unfortunately we are unable to say more about the nature and time of occupation of the surface component.

During his periodic surveys of the site, Reichart noted lithic artifacts, burned limestone and calcium carbonate-encrusted bone fragments eroding from the cut-bank at the site (hence our name for it). These finds occurred in two areas north and south of a disconformity that formed when a drainage ravine, which had been dammed to form a pond at the edge of the surface component, was filled with dark brown silt. The exposed sediments on either side of the disconformity and in the area of the buried cultural deposits consist of silty clays. However, these deposits contrast in color and are suggested to represent two periods of cut-and-fill. To the north of the disconformity these sediments are dark grayish brown in color; those to the south are pale to yellowish brown and are more oxidized. Artifacts occur in both fills but at different depths. Reichart noted that artifacts north of the disconformity occurred at a depth of about two meters below the present surface and that those to the south were limited to a ten centimeter cultural horizon approximately 3.5 m below surface.

Artifacts found by Reichart in the northern area include a chipped stone knife that is diagnostic of the Munkers Creek phase of the Archaic period (see chapter 6). Reichart (1984) describes another Munkers Creek knife found at a site near Half Mound, Kansas, north of the Cut-Bank site. A third knife of this type has also been found at 14JF34, in the southern portion of the Perry Lake Project Area, by personnel of the Kansas City District, U. S. Army Corps of Engineers (Roger Grosser, personal communication). These finds suggest that the range of the Munkers Creek phase of the Archaic period should be extended northeast of that area defined by Witty (1982b:218-228) on the basis of more extensive data from Zone III at the William Young site in the Council Grove Lake Area and Horizons III-5, III-7, and III-8 at the Coffey site in the Tuttle Creek Lake Area (cf. Schmits 1978). Based

on radiocarbon dates from the Munkers Creek levels at these sites, the phase has been suggested to date from about 3500 to 3000 B.C. (Witty 1982b).

Our investigations of the Munkers Creek phase component consisted of the excavation of a profile in the area of Reichart's finds. This profile revealed the dark brown silty clay stratum described by him and evidence of the leaching of calcium carbonates. It also revealed the scattered remains of a hearth that consisted of scattered small pieces of highly oxidized limestone and a concentration of charcoal. A radiocarbon date of 5710±100 B.P.: 3760 B.C. (Beta-29436) was obtained from a sample of this charcoal (see Appendix 2). The one-sigma range of this date is about 150 years older than the suggested range of the Munkers Creek phase. However, considering the small number of absolute dates currently available for this complex, we think it is accurate. In fact, this date falls within the range of one from Horizon III-8 at the Coffey site of 5850±135 B.P.: 3730 B.C. (Schmits 1978:85). It is suggested, therefore, that this feature is additional evidence of the Munkers Creek phase in the Delaware River basin. This area may well retain additional evidence that can shed more light on the activities that occurred in this area during the Middle to Late Archaic period.

Artifacts recovered by Reichart from the southern area of the cut-bank include a variety of chipped stone tools, including projectile points. Unfortunately the assignment of some of these finds to either the surface or buried components is not possible. During one of his periodic surveys in this area, Reichart found a barbed projectile point base in situ at the 3.5 m level. He later conducted a limited test excavation at this level in a location he designated Area 861 (Reichart 1988b). This excavation yielded a small amount of charcoal and burned earth, several pieces of carbonate-encrusted animal bone, hematite, a few cores, numerous pieces of debitage, three bifaces, and a reworked projectile point (see chapter 6).

Our investigation of the southern buried component entailed excavation of two profiles at the level of Reichart's finds. One profile was dug immediately south of his test at Area 861 and this yielded only two pieces of debitage, supporting Reichart's interpretation of Area 861 as a concentrated activity area of chipped-stone tool manufacture. The other profile, located north of Area 861, revealed pale brown, oxidized silty clay sediments that contrast with those north of the disconformity. It also revealed a concentration of highly oxidized limestone and two pieces of debitage. Flotation of fill from this feature yielded a small sample of lithic debris, bone, burned rock, burned earth, and charcoal. A sample of charcoal recovered beneath some of the stones provided a radiocarbon date of 8220±350 B.P.: 6270 B.C. (Beta-29435; see Appendix 2).

If this date is accurate it is the oldest one yet obtained from an archaeological context in northeastern Kansas. The radiocarbon date is about 300 years older than those obtained from the Sutter site. Katz (1971, 1972) compared data from that site, located in the Muddy Creek drainage 23 km (14.5 mi) southwest of the Cut-Bank site to the Frederick and McKean complexes of the northwestern Plains. The Frederick complex dates to about 6200 B.C. and thus fits well with the radiocarbon date from Feature 1 at the Cut-Bank site. However, the square-stemmed projectile points characteristic of that complex and those found at the Sutter site do not compare well to Reichart's point from Area 861.

Obviously, more work is needed at the Cut-Bank site in order to satisfactorily confirm the age of the cultural deposits south of the disconformity and to find out more about the nature of the activities that occurred at both of the buried components. The mid-Holocene, Archaic period of occupation in the project area is so poorly known that the most basic problems of culture history and site function must be addressed. Who was responsible for these manifestations and what kind of things were they doing? With these questions in mind, data from the younger of the two buried components can be compared profitably to Munkers Creek components at the Coffey (Schmits 1978) and William Young sites (Witty 1982b). Data from the older component can be compared to that from the nearby Sutter site (Katz 1971, 1972).

The sample of lithic artifacts recovered from both of the buried components by Reichart includes a high frequency of non-local cherts, especially Flint Hills material. A rewarding line of inquiry regarding a more extensive lithic assemblage from the site would focus on the relative proportions of local and exotic cherts as a measure of Archaic mobility. The presence of Flint Hills cherts may point to a westward, prairie-oriented settlement-subsistence pattern.

Perhaps the most fruitful research that should be pursued during future work at this site is the nature of cultural adaptations that prevailed in this area at a time when the climate was significantly drier than that of the late Holocene. This period, the Altithermal (Antevs 1955) or Hypsithermal (King 1980), had a profound affect on the relative distribution of prairie and woodland communities throughout the Great Plains. As reviewed in chapter 2, Gruger's (1973) analysis of pollen data from Muscotah Marsh demonstrates this affect in the Delaware River basin. The pollen spectra from that locality reflect a marked regression of the woodland component of the ecotone during that climatic episode.

The dates provided by Gruger (1973) for this prairie interval bracket those of both buried components at the Cut-Bank site. The Cut-Bank site offers a unique opportunity to determine the nature of the human response to this environmental change during two occupations about 2500 years apart. Possible though admittedly meager evidence of the affect this environmental change may have exerted on hunting practices is the presence of bison in the older Archaic component. As discussed in more detail in the faunal section of chapter nine, the recovery of more adequate samples of animal remains should provide the means for a comparison of hunting practices among Archaic groups in the Central Plains and for comparison or contrast between the economic adaptations of Archaic and later ceramic-age populations in that region.

Plains Woodland

The Senn's Hill site (14JF414), which was investigated during this project, is an example of the occupation of uplands in the Delaware River basin during the Grasshopper Falls phase of the Plains Woodland period. In defining the phase, Reynolds (1979:103) noted that over 120 site components of the Grasshopper Falls phase had been recorded in the Delaware River basin and that the "majority of these are habitation sites located on alluvial terraces adjacent to the floodplain of the Delaware River and its tributaries". Reynolds defined the phase on the basis of data from three sites excavated by the Kansas State Historical Society in 1967 under an agreement with the National Park Service. These sites, Malm, Anderson, and Teaford, all contained evidence of house structures and, with the exception of House 2 at the Malm site, extramural features such as storage pits and hearths. House 2 at the Malm site contained interior pits. Paired houses were indicated at the Malm and Anderson sites and the outline of a single house was recorded at the Teaford site. The sites yielded a variety of chipped-stone and groundstone artifacts and large samples of relatively monotypic ceramic assemblages defined by Reynolds (1979) as Grasshopper Falls ware. All three of these sites had one other aspect in common; they had been disturbed to some extent by cultivation. Cultural materials were not found at depths greater than about 45 cm (1.4 ft) at any of these sites and at each the upper 15-20 cm had been disturbed by plowing. A fourth site of this phase, 14JF350, has also been excavated by the Kansas State Historical Society and the Kansas Anthropological Association with similar results (Barr 1971; Milton Reichart, personal communication).

Three of the sites tested during the Perry Lake Archaeological Project proved to be habitations of the Grasshopper Falls phase and are comparable in many respects to the three type sites. Unlike the latter, however, these sites have deep deposits that have never been plowed. The

relatively intact nature of these sites combined with the abundance and variety of artifacts associated with them indicates great research potential.

The Reichart site is located on an alluvial terrace on the west shore of Perry Lake. Prior to the inundation of the reservoir, the site would have been a short distance from the Delaware River. The site consists of two mounds that were recorded individually as 14JF448 and 14JF449. We have decided to refer to them as a single site and give it the name of its discoverer, Milton Reichart. Our investigations at the Reichart site entailed excavation of a one meter square test pit at mound 14JF449 and two test units at Mound 14JF448, and the extraction of soil cores from both mounds with a Gidding mobile earth drill. Cultural material, including many sherds of Grasshopper Falls ware (see chapter 8), lithic tools and debris, burned limestone and fire-cracked quartzite, mussel shell and animal bone, was found in considerable quantities in both mounds to depths of 55-75 cm. The presence of a thick horizon of daub in Mound 14JF448 attests to the remains of a house structure. Flotation samples from this mound yielded a variety of faunal remains (see section on that assemblage in chapter 9). Our excavations, though of limited extent, detected a contrast between the two mounds in terms of structural evidence. Mound 14JF449 contains little daub whereas Mound 14JF448 contains a considerable quantity of this material. Whether this reflects differences in the nature or construction of the habitation structures that existed at each locality is a question that can be only be satisfactorily addressed through more extensive excavation.

Like the Reichart site, the Quixote site consists of paired mounds. Its setting differs in that it is located on the toe of a hillslope on the southern bank of Cedar Creek, a tributary of the Delaware River. Like the Reichart site, the Quixote site area has never been cultivated. Our investigations at the site included the excavation of shovel tests around the mounds and of test units on those features. This fieldwork revealed a concentration of large slabs of burned limestone, pottery and other debris in each mound that might represent living surfaces. However, these concentrations were contained within 60-65 cm of essentially unstratified cultural deposits of comparable material differing only in the absence of large pieces of limestone. Numerous sherds of Grasshopper Falls ware, a few arrow points and lithic debitage, hearth debris, mussel shell, and animal bone were distributed in a fairly uniform manner throughout the deposits with no apparent occupational hiatus. Unlike Mound 14JF448 at the Reichart site, neither of the mounds at the Quixote site yielded significant quantities of daub. Whether this reflects a contrast in the nature of the habitations that resulted in the mounds at the Quixote site remains to be seen.

In summary, our findings from the two mound sites of the Grasshopper Falls phase indicate both contain deep deposits that have been spared agricultural disturbance. In this regard, they are unique and promise to yield to careful excavation at some future time a great deal of new information about this complex. Among the problems that can be approached during such research are the following:

1) Do the sites represent continuous occupation or periodic abandonment and re-occupation?

> Our excavations indicate that the mounds at both the Reichart and Quixote sites were gradually built up through what appears to have been an uninterrupted occupation. However, more extensive excavation of these sites entailing three dimensional plotting of artifacts is required in order to document this process. If the occupations were continuous, this points to a greater degree of sedentism for the Grasshopper Falls phase than is currently recognized.

2) Does the fact that both sites consist of paired mounds reflect the social organization as well as the size of the occupying group?

> Reynolds (1979:81) describes paired habitation structures at the Malm and Anderson sites (the presence of more than one at the Teaford site is not known) and suggests these reflect occupation by nuclear or extended families with a total site population of 12 to 15 persons. Further work at the Reichart and Quixote sites may support this residence pattern and population estimate.

3) Does any floral evidence preserved at both sites include evidence for agriculture?

> Preliminary tests of this hypothesis have already been conducted with the macrofloral and opal phytolith evidence we acquired during our investigations (see relevant sections in chapter 9). Although these were negative regarding any evidence of agriculture, the results should not be considered conclusive given the limited samples on which they are based. Reynolds (1979:78-79) could not discern any evidence, either in the form of farming implements or cultigen remains, of food production at the three type sites. However, the sites he was describing had not benefited from the application of the flotation technique. Extensive use of this method during any future work at the Reichart and Quixote sites may yield such evidence or, conversely, support the presently held belief that the subsistence pattern of the Grasshopper Falls phase was one of "primary forest efficiency" (Caldwell 1958), an

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entailed extensive probing with an Oakfield coring tool and the excavation of test units. Material recovered during previous surveys and as a result of our fieldwork indicates a single prehistoric occupation of the Plains Village period. This material includes large pieces of daub, triangular notched and unnotched arrow points, sandstone abraders, and ceramic sherds with both Pomona variant and Central Plains Tradition attributes. The ceramics include a few collared rim fragments comparable to ware characteristic of Central Plains Tradition complexes centered west and north of the study area but not unknown in ceramic assemblages from sites of the Pomona variant in the Delaware River basin (see chapter 8).

Our tests demonstrated the deposits at the site retain some integrity. Although recent cultivation has disturbed the upper 10-20 cm, significant quantities of cultural debris were recovered to a depth of at least 30-40 cm in all excavated units. Of particular importance is the presence of a great amount of daub in these lower levels, which suggests the floor of the habitation structure it represents and sub-floor features such as postmolds and storage pits have been spared any damage by plowing. Moreover, the contrast between the dark grayish brown A horizon and the yellowish-brown AC horizon at these levels should facilitate detection of these features.

The Bowies Branch site may provide answers to a number of current research problems concerning the nature of the relationship among the various Plains Village populations in this part of the Central Plains. Surveys and excavations of Plains Village sites throughout northeastern Kansas have frequently revealed an association of ceramic wares comparable in some respects to that of the Bowies Branch site. To the east of the Delaware River basin, in the Stranger Creek watershed or the drainages of several small tributaries of the lower Kansas and Missouri Rivers, these sites generally have a combination of Pomona and Platte Valley wares (the latter being the diagnostic ceramic of the Steed-Kisker phase). This is not surprising given the fact that the core area of the Steed-Kisker phase is along the Missouri River north of present Kansas City and that the Delaware River is the core area of the Apple Valley phase of the Pomona variant. The region between the lower Missouri and Delaware Rivers has been interpreted as a shared resource area or "frontier" of these two Plains Village complexes (Logan 1988c, 1988d). The participation of Central Plains Tradition groups, especially those of the Nebraska phase, in the sharing of this frontier has also been inferred, though evidence is more scant. Associated Pomona and Central Plains Tradition wares at Plains Village sites, such as Bowies Branch, in the Delaware River basin may similarly reflect interaction between indigenous Pomona groups and Central

Plains Tradition folk to the west (Smoky Hill phase) or north (Nebraska phase).

It remains for future investigators of the Bowies Branch site to more specifically identify the cultural affiliation of its prehistoric occupants by revealing structural features and recovering greater quantities of ceramic material. The data we have described from limited testing suggests chances of defining the remains of a wattle-and-daub house and its associated features is great. Given the contrast between the house forms of the Pomona and Central Plains Tradition complexes as well as that between their respective ceramic artifacts (see chapter 3), this culture-historical research goal should be easily attained.

The limited size of the Bowies Branch site suggests its occupation was by a small group, perhaps a single family. However, the variety of artifacts recovered to date points to a wide range of site activities and the presence of a house structure indicates at least a seasonal stay. Intensive excavation will probably yield an even greater assortment of cultural debris, including biological material, with which to address current research problems about the degree of sedentism and dependence on food production of Plains Village populations in the Central Plains (Adair 1988).

Recommendations

No recommendations of signficance or eligibility for the National Register of Historic Places can be presented on the basis of data at hand for the following sites investigated during this project: 14JF38, 14JF103, 14JF105, 14JF410, 14JF414, 14JF417, 14JF421, 14JF447, 14JF450, 14JF477, 14JF482, and 14JF484. It is suggested, however, that the area which we delimited with lathing, fence posts, and flagging around the basin hearth (Feature 1) at 14JF414 be withdrawn from agricultural production or buried with earth to a depth sufficient to preserve that portion left unexcavated. Considering the fact that this feature occurs on the edge of the field in an area of poor crop growth, this should entail no sacrifice on the part of any tenant farmer. An historic well presently protected in a wooded area of 14JF105 and which may contain a record of the Historic occupation of that site should be tested in the event of any future construction in order to determine its research potential. We also recommend periodic inspection of the buried components at 14JF410 and 14JF482 by Corps personnel to recover any cultural material that may become exposed as a result of lateral erosion by the Delaware River. Despite the evident ineligibility of these sites for the National Register, they may yet retain isolated features which could provide information valuable for understanding the general prehistory of the Perry Lake Project Area.

Backhoe excavation indicates, as Reichart (personal communication) has suggested, that much of the buried cultural horizons at the Cut-Bank site (14JF409) has been removed by erosion of the Delaware River. Whatever materials remain for future investigation are probably confined to the narrow strip of bank two to three meters in width between the profiles and backhoe trench we excavated. Preservation or mitigation of this area is essential.

The Quixote site (14JF420) occurs in pasture and is not currently under agricultural production. However, the area is subject to periodic cattle ranging and overgrazing may endanger the vegetative cover shielding this important site. It is suggested that the site be protected from overgrazing and removed from any future consideration of agricultural production. Though no evidence of vandalism was noted at this site, it should be periodically monitored for such activities. If "pot-hunting" occurs it may be necessary to protect the site with a fence or some other structure.

The Reichart site (14JF448/449) occurs in woodland and is not currently under agricultural production. However, the upper portion of both mounds has been disturbed by natural processes, particularly those related to root growth and tree-fall, that can radically affect the cultural deposits if left untreated (Wood and Johnson 1978). These effects should be impeded by removing the tree cover from the site area and allowing grasses to dominate it. The deposits at the Quixote site demonstrate the more benevolent effects of grasses as cover.

The Bowies Branch site (14JF423) has been disturbed by plowing. Although a significant portion of the cultural deposits remain intact, continued farming of the site area will eventually destroy its integrity. We strongly recommend removing the site area from agricultural production and planting it in native grasses in order to protect the important cultural resources that remain.

Appendix 1

PERRY LAKE ARCHAEOLOGICAL PROJECT: HISTORIC ASSEMBLAGES

Michelle Dunlap

Site No	Unit No	Level (cm)	Catalog No.	Description
14JF38	1	2 (10-20)	JF038880004	clear bottle glass frag.
14JF38	1	2 (10-20)	JF038880006	8 clay pigeon frags.
14JF38	1	3 (20-28)	JF038880007	pop tab
14JF38	1	3 (20-28)	JF038880008	2 pieces clear bottle frag. amber bottle glass frag.
14JF38	2	1 (0-10)	JF038880014	4 pop tabs
14JF38	2	1 (0-10)	JF038880015	5 pieces clear bottle frag. 4 pieces green bottle frag. 6 pieces amber bottle frag.
14JF38	2	1 (0-10)	JF038880016	4 pieces of plastic
14JF38	2	1 (0-10)	JF038880017	wire fastener
14JF38	2	1 (0-10)	JF038880018	a piece of fishing line
14JF38	2	1 (0-10)	JF038880021	24 clay pigeon frags.
14JF38	2	2 (10-20)	JF038880024	pop tab
14JF38	2	2 (10-20)	JF038880025	2 pieces window glass clear bottle glass frag. green bottle glass frag. dark-green bottle glass frag.
14JF38	2	2 (10-20)	JF038880026	wire nail
14JF38	2	2 (10-20)	JF038880027	misc. metal
14JF38	2	2 (10-20)	JF038880030	28 clay pigeon frags
14JF38	3	1 (0-10)	JF038880037	burnt wood
14JF38	3	1 (0-10)	JF038880038	stone ware
14JF38	3	1 (0-10)	JF038880039	5 pop tabs
14JF38	3	1 (0-10)	JF038880040	2 pieces clear bottle frag. amber bottle glass frag.
14JF38	3	1 (0-10)	JF038880041	bottle top
14JF38	3	1 (0-10)	JF038880044	4 coal clinkers
14JF38	3	2 (10-20)	JF038880049	square nail
14JF38	4	1 (0-10)	JF038880057	8 pop tabs

Site No	Unit No	Level (cm)	Catalog No.	Description
14JF38	4	1 (0-10)	JF038880058	bottle tab
14JF38	4	1 (0-10)	JF038880059	3 pieces misc. metal
14JF38	4	1 (0-10)	JF038880060	plastic tent peg
14JF38	4	1 (0-10)	JF038880063	clay pigeon frag.
14JF38	4	1 (0-10)	JF038880064	7 coal clinkers
14JF38	4	1 (0-10)	JF038880105	2 pieces green bottle frag.
14JF38	5	1 (0-10)	JF038880069	pop tab
14JF38	5	1 (0-10)	JF038880070	clear bottle glass frag.
14JF38	5	1 (0-10)	JF038880071	bottle top
14JF38	5	1 (0-10)	JF038880072	5 pieces misc. metal
14JF38	5	1 (0-10)	JF038880073	wire nail
14JF38	5	1 (0-10)	JF038880074	piece wire
14JF38	5	2 (10-20)	JF038880076	5 coal clinkers
14JF38	5	2 (10-20)	JF038880082	stone ware
14JF38	5	2 (10-20)	JF038880083	square nail
14JF38	5	2 (10-20)	JF038880084	2 pieces misc. metal
14JF38	5	2 (10-20)	JF038880086	2 clay pigeon frags.
14JF38	5	(15)	JF038880077	2 iron bolts
14JF38	6	1 (0-10)	JF038880087	2 pieces misc. metal
14JF38	6	1 (0-20)	JF038880093	a piece burnt wood
14JF38	6	1 (0-20)	JF038880094	clear bottle glass frag. green bottle glass frag.
14JF38	6	1 (0-20)	JF038880095	wire nail
14JF38	6	1 (0-20)	JF038880096	a piece of wire
14JF38	6	1 (0-20)	JF038880097	bottle tap
14JF38	6	1 (0-20)	JF038880098	washer
14JF38	6	1 (0-20)	JF038880099	2 pieces misc. metal
14JF38	6	1 (0-20)	JF038880100	wire mesh
14JF38	6	1 (0-20)	JF038880102	4 clay pigeon frags.
14JF38	6	1 (0-20)	JF038880103	4 coal clinkers
14JF38		surface	JF038880107	Journey pin
14JF103	3	1 (0-20)	JF103880019	square nail
14JF103	3	1 (0-20)	JF103880022	2 cinders
14JF105	1	1 (0-10)	JF105880003	green bottle glass frag.
14JF105	1	1 (0-10)	JF105880006	2 cinders
14JF105	1	2 (10-20)	JF105880012	2 cinders
14JF105	4	2 (10-20)	JF105880022	cinder

Site No	Unit No	Level (cm)	Catalog No.	Description
14JF409	2	1 (0-10)	JF409880018	5 cinders
14JF409	2	1 (0-10)	JF409880019	clay pigeon frag.
14JF409	2	2 (10-20)	JF409880022	cinder
14JF417	3	1 (0-20)	JF417880014	burnt wood
14JF417	4	1 (0-20)	JF417880017	2 pieces burnt wood
14JF417	5	1 (0-20)	JF417880022	burnt wood
14JF417	5	1 (0-20)	JF417880023	nail?
14JF420	1	2 (10-20)	JF420880011	metal barbed
14JF420	1	2 (10-20)	JF420880012	piece of metal
14JF420	1	3 (20-30)	JF420880023	piece of wire
14JF420	2	1 (0-10)	JF420880086	cinder
14JF420	ST.#2		JF420880191	wire nail
14JF423	1	2 (10-20)	JF423880010	3 pieces burnt wood
14JF423	2	2 (10-20)	JF423880036	burnt wood
14JF423	2	2 (10-20)	JF423880038	whiteware frag.
14JF423	3	1 (0-10)	JF423880054	clear bottle glass frag.
14JF423	3	2 (10-20)	JF423880060	5 pieces burnt wood
14JF447	1	1 (0-10)	JF447880035	2 nails?
14JF447	2	1 (0-10)	JF447880004	2 pieces whiteware
14JF447	2	1 (0-10)	JF447880006	stoneware frag.
14JF447	2	2&3 (10-30)	JF447880015	2 pieces whiteware
14JF447	2	2&3 (10-30)	JF447880016	7 nails?
14JF447	3	1 (0-10)	JF447880021	2 ?ware
14JF447	3	1 (0-10)	JF447880022	2 pieces clear bottle frag.
14JF447	3	1 (0-10)	JF447880023	square nail nail?
14JF447	3	1 (0-10)	JF447880026	12 cinders
14JF447	4	1 (0-10)	JF447880034	stoneware frag.
14JF447	ST.#15	surface	JF447880054	iron or whiteware
14JF447	ST.#16	surface	JF447880055	decorated ware?
14JF448	1	1 (0-10)	JF448880008	bullet?
14JF477	3	2 (10-20)	JF477880012	stoneware frag.
14JF477	ST.#19	surface	JF477880021	square nail
14JF484	3	1 (0-10)	JF484880017	square nail head
14JF484	ST.#5	surface	JF484880025	stoneware frag.

Appendix 2

RADIOCARBON DATES FROM THE PERRY LAKE ARCHAELOGICAL PROJECT

Brad Logan

14JF409

Feature 1 (Hearth)

Beta-29435

Charcoal (25 gm sample submitted; .2 gm for extended counting)

Radiocarbon Age: 8220±350 B.P.: 6260 B.C.

Date beyond the range of current calibration.

Feature 2 (Hearth Debris)

Beta-29436

Charcoal (91 gm sample submitted; .7 gm for counting)

Radiocarbon Age: 5710±100 B.P.: 3760 B.C.

Calibrated ages:	cal B.C.	4577, 4553, 4547
	cal B.P.	6526, 6502, 6496

Minimum of cal age ranges (cal ages) maximum of cal age ranges:

one sigma	cal B.C.	4720	(4577, 4553, 4547)	4460
	cal B.P.	6669	(6526, 6502, 6496)	6409
two sigma	cal B.C.	4831	(4577, 4553, 4547)	4350
	cal B.P.	6780	(6526, 6502, 6496)	6299

14JF410

Paleosol (Trench 1)

Beta-29656

Soil Humates (1950 gm sample submitted)

Radiocarbon Age: 910±70 B.P.: A.D. 1040

C-13 Adjusted C-14 Age: 1000±70 B.P.: A.D. 950

14JF414

<u>Feature 1 (Basin Hearth)</u>

<u>Beta-29433</u>

Charcoal (60 gm sample submitted; .6 gm for counting)

Radiocarbon Age: 2620±110 B.P.: 670 B.C.

Calibrated age: cal B.C. 801
cal B.P. 2750

Minimum of cal age ranges (cal ages) maximum of cal age ranges:

one sigma	cal B.C. 896	(801)	603
	cal B.P. 2845	(2750)	2552
two sigma	cal B.C. 1010	(801)	410
	cal B.P. 2959	(2750)	2359

<u>Feature 1 (Basin Hearth)</u>

<u>Beta-29434</u>

Charcoal (85 gm sample submitted; 3.0 gm for counting)

Radiocarbon Age: 1200±60 B.P.: A.D. 750

Calibrated ages: cal A.D. 780, 790, 802, 843, 853
cal B.P. 1170, 1160, 1148, 1107, 1097

Minimum of cal age ranges (cal ages) maximum of cal age ranges:

one sigma	cal A.D. 694	(780, 790, 802, 843, 853)	937
	cal B.P. 1256	(1170, 1160, 1148, 1107, 1097)	1013
two sigma	cal A.D. 670	(780, 790, 802, 843, 853)	980
	cal B.P. 1280	(1170, 1160, 1148, 1107, 1097)	970

14JF482

<u>Paleosol (Trench 1)</u>

<u>Beta-29657</u>

Soil Humates (2340 gm sample submitted)

Radiocarbon Age: 2380±70 B.P.: 430 B.C.

C-13 Adjusted C-14 Age: 2450±70 B.P.: 500 B.C.

Appendix 3

FREQUENCY OF LITHIC RAW MATERIAL TYPES

Byron Loosle

The following tables present frequencies of lithic material types identified in the lithic assemblages of 16 prehistoric sites, investigated as part of the Perry Lake Archaeological Project. A table for each site is given listing its prehistoric cultural affiliation(s), frequencies of lithic raw material types and their heat modified forms (see chapter 7). Tables include all lithic tools and debitage recovered during investigation. Symbols used in the tables are defined as follows:

xu	excavation unit
FS	Surface find
T	Toronto chert with no heat modification
TH	heat modified Toronto chert
F	Flint Hills chert with no heat modification
FH	heat modified Flint Hills chert
P	Plattsmouth chert with no heat modification
PH	heat modified Plattsmouth chert
M	Fine grained white cherts with no heat modification
MH	heat modified fine grained white cherts
R	Medium grained white cherts with no heat modification
RH	heat modified medium grained white chert
K	River cobbles with no heat modification
KH	heat modified river cobbles
W	Winterset chert with no heat modification
WH	heat modified Winterset chert
O	Unknown material with no heat modification
OH	heat modified unknown material
S	Sioux quartzite with no heat modification
SH	heat modified Sioux quartzite
Q	Quartzite with no heat modification
QH	heat modified quartzite

14JF38 (Plains Woodland, Plains Village)

xu	Depth (cm)	T	TH	F	FH	P	PH	M	MH	R	RH	K	KH	O	OH	W	WH
1	0-20	0	2	1	0	0	0	1	0	0	0	1	0	0	0	0	0
2	0-10	3	3	1	1	3	1	1	1	0	0	1	0	0	0	0	0
2	10-20	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0
3	0-10	3	3	2	0	2	3	1	10	0	0	0	0	1	0	0	1
3	10-20	2	2	1	3	0	0	0	0	0	1	0	1	0	1	0	0
4	0-10	8	6	4	4	1	1	1	0	0	1	1	0	2	5	0	0
5	0-10	6	2	1	0	0	0	0	1	0	0	0	0	0	0	1	0
5	10-20	0	1	0	1	2	1	1	0	3	2	2	0	0	1	0	0
6	0-20	1	0	6	6	4	1	1	0	1	2	2	0	0	2	0	0
	FS	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total		25	19	17	15	13	7	6	12	4	6	7	1	3	10	1	1

14JF103 (Unknown Affiliation)

xu	Depth (cm)	T	TH	F	FH	P	PH	K	KH	O	OH	S	Q	QH
1	0-20	5	2	0	0	0	1	0	0	0	0	0	0	1
2	0-20	6	3	0	1	2	0	0	0	0	1	1	0	0
2	20-30	1	0	0	0	0	0	0	0	0	0	0	0	0
2	30-36	0	0	0	0	1	0	0	0	0	0	0	0	0
3	0-20	3	0	0	0	1	0	0	0	0	0	0	0	0
4	0-20	1	0	0	0	0	1	0	0	0	0	0	0	0
5	0-16	2	0	1	3	1	0	0	0	0	0	0	1	0
6	0- 5	4	0	3	1	0	0	1	1	1	1	1	0	0
	FS	0	0	0	0	0	0	0	0	1	0	0	0	0
Total		22	5	4	5	5	2	1	1	2	2	2	1	1

14JF105 (Late Archaic, Plains Village)

xu	Depth (cm)	T	TH	F	FH	P	R	O	OH	S	SH
1	0-10	0	3	6	0	1	0	1	0	0	0
1	10-20	9	7	2	6	1	0	0	0	1	0
1	20-30	0	1	1	0	0	0	0	0	0	1
2	10-20	0	1	0	0	0	0	0	0	0	0
3	10-20	0	1	0	0	0	0	0	1	0	0
4	0-10	1	0	0	0	0	0	0	0	0	0
4	10-20	3	0	0	0	0	0	0	0	0	0
4	20-30	0	2	0	0	0	0	0	0	0	0
4	30-40	0	1	0	0	0	0	0	0	0	0
	FS	0	1	0	2	0	1	0	0	1	0
Total		13	15	9	7	2	1	1	1	1	1

14JF409 (Early-Middle Archaic, Late Archaic and/or Plains Woodland)

xu	Depth (cm)	T	TH	F	FH	P	K	S	Q
1	0-20	1	0	6	0	0	0	0	0
1	20-30	0	0	2	1	0	0	1	1
2	0-10	0	0	0	0	0	1	0	0
Profile 2		1	0	0	0	0	0	0	0
Profile 3		0	1	1	0	0	0	0	0
	FS	0	0	0	0	1	0	0	0
Total		2	1	9	1	1	1	1	1

14JF414 (Late Archaic?, Grasshopper Falls phase, Plains Village)

xu	Depth (cm)	T	TH	F	FH	P	PH	M	MH	R	RH	K	KH	O	OH	W	WH	S	SH	Q	QH
1	0-10	3	2	6	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	1
1	10-20	4	2	3	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2	0-20	5	7	8	3	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
3	0-10	8	0	5	2	1	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0
3	10-20	6	4	3	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
3	20-30	2	0	1	0	0	1	2	0	0	0	0	1	0	0	1	1	0	0	0	0
4	0-10	5	4	1	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4	10-20	6	2	5	3	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0
5	0-10	4	2	3	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5	10-20	1	2	2	3	0	0	2	0	0	0	0	0	0	0	1	0	0	1	0	0
6	0-10	2	2	3	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0
6	10-20	3	2	2	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
7	0-10	16	4	13	3	0	0	2	0	2	0	0	1	1	0	0	0	0	0	0	0
7	10-20	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
8	0-10	8	7	9	2	0	0	5	0	1	1	2	2	0	0	0	0	0	0	0	0
8	10-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
9	0-10	14	8	1	1	0	0	3	0	0	0	0	0	0	0	1	0	0	0	1	0
9	10-20	5	1	1	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
10	0-10	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
10	10-20	2	3	5	2	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
10	20-30	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	1	0
10	30-40	3	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
11	0-20	17	10	12	4	2	0	1	0	0	1	4	0	1	0	0	0	2	0	2	0
12	0-20	22	6	22	4	4	0	2	0	4	1	0	0	0	0	0	0	0	0	1	0
13	0-10	5	5	5	3	2	4	0	0	4	3	2	0	0	0	0	1	0	0	2	0
13	10-20	3	7	11	2	0	1	3	3	2	0	0	0	0	1	0	0	1	0	0	0
13	20-30	1	0	0	1	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
14	0-20	7	12	13	6	3	2	2	0	8	3	0	0	2	2	0	0	0	0	1	0
	FS	4	0	7	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	3	0
Totals		157	93	143	51	14	13	32	5	17	9	12	7	10	6	5	2	5	2	12	1

14JF417 (Late Archaic?, Plains Woodland)

xu	Depth (cm)	T	TH	F	FH	P	PH	M	R	RH	K	KH	O	OH	SH
1	0-20	5	3	5	1	0	0	0	0	0	2	0	0	0	0
2	0-20	5	2	1	2	0	0	2	3	2	0	0	1	0	0
2	20-30	0	0	0	0	0	0	0	1	0	0	0	0	0	0
3	0-20	3	0	3	0	0	0	0	0	0	0	1	1	1	0
4	0-20	3	3	2	2	0	2	0	1	0	2	0	0	0	1
5	0-20	3	2	2	1	1	0	0	4	1	0	0	1	1	0
	FS	2	0	2	1	0	0	0	0	0	1	0	0	0	0
	Total	21	10	15	7	1	2	2	9	3	5	1	3	2	1

14JF420 (Grasshopper Falls phase)

xu	Depth (cm)	T	TH	F	FH	P	PH	M	MH	R	RH	K	KH	O	OH	W	S	SH	Q	QH
1	0-10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	10-20	19	10	8	6	3	2	0	0	1	0	0	0	3	2	0	4	0	0	0
1	20-30	18	9	10	4	0	3	0	0	2	1	0	0	1	3	1	5	0	0	0
1	30-40	15	4	7	3	3	1	0	0	0	0	0	0	1	0	0	2	0	0	0
1	40-50	18	5	8	5	4	0	0	0	0	1	1	0	1	4	0	4	0	0	0
1	50-60	18	4	4	3	2	0	0	2	0	0	0	0	1	1	0	3	0	0	0
1	60-70	2	1	2	1	0	1	0	0	0	1	0	0	0	1	1	1	0	0	0
2	0-10	2	1	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2	10-20	9	5	4	4	3	1	0	0	0	2	2	0	2	2	0	2	1	1	0
2	20-30	4	3	3	1	1	0	0	0	0	0	2	0	0	0	0	4	0	0	0
2	30-40	5	2	5	0	0	0	0	0	2	2	0	0	1	1	0	3	0	1	1
2	40-50	3	2	8	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0
2	50-60	6	1	2	0	0	1	0	0	1	0	1	0	0	0	0	1	0	2	0
2	60-62	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
3	0-10	2	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0
3	10-20	12	4	6	6	0	1	1	0	3	3	1	1	0	1	1	1	0	1	0
3	20-30	6	0	5	3	3	1	0	0	0	1	0	0	0	0	0	1	0	0	0
3	30-40	4	0	4	1	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0
	ST 3	4	0	0	3	0	1	0	1	0	0	1	0	0	0	0	1	0	1	0
	ST 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	ST 5	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	ST 6	1	0	1	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	ST 7	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
	ST 8	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ST 9	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
	ST 10	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ST 11	0	0	1	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	ST 12	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	ST 14	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	157	52	83	41	24	13	2	3	11	12	8	1	12	18	3	41	1	9	1

14JF421 (Plains Woodland, Plains Village)

xu	Depth (cm)	T	TH	F	FH	P	PH	M	MH	R	RH	K	KH	O	OH	W	S	SH	Q
1	0-10	17	10	10	7	1	0	2	1	0	0	3	0	0	7	0	1	0	0
1	10-20	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0-10	2	1	3	7	2	1	0	0	2	0	0	0	1	0	0	0	0	1
2	10-20	7	3	12	4	2	0	0	1	0	1	0	2	1	3	1	1	0	0
2	20-30	0	0	1	0	2	0	1	0	0	0	0	0	0	1	0	0	0	0
2	30-40	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0-10	11	2	11	5	0	0	1	1	1	0	0	0	0	5	0	1	1	0
3	10-20	8	2	12	0	1	1	1	0	0	0	0	0	0	2	0	0	0	0
4	0-10	0	2	5	4	2	0	0	0	2	0	0	0	0	1	0	0	0	0
4	10-20	6	1	6	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
	FS	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1
	Total	52	24	61	29	10	2	5	3	5	1	3	2	5	19	1	3	1	2

14JF423 (Plains Village)

xu	Depth (cm)	T	TH	F	FH	PH	M	MH	K	O	OH	S	Q
1	0-10	2	1	12	6	0	0	0	0	0	0	0	0
1	10-20	1	0	1	12	0	2	1	0	1	0	0	0
1	20-30	1	0	3	4	0	2	0	0	0	0	0	0
1	30-40	0	0	0	3	0	0	0	0	0	0	0	0
1	40-50	0	0	0	0	0	0	0	1	0	0	0	0
2	0-10	3	1	8	16	0	2	0	0	0	0	0	0
2	10-20	1	0	23	14	0	1	0	1	1	0	0	0
2	20-30	2	0	6	4	1	0	0	0	0	0	0	0
3	0-10	0	0	15	19	0	0	0	0	2	0	0	1
3	10-20	3	0	21	41	0	1	0	0	0	1	1	0
3	20-30	1	1	10	8	0	1	4	1	0	0	0	1
3	30-40	0	0	0	0	0	0	0	0	2	0	0	1
	Total	14	3	99	127	1	9	5	3	6	1	1	3

14JF447 (Late Archaic, Plains Woodland)

xu	Depth (cm)	T	TH	F	FH	P	PH	M	RH	K	KH	O	OH	Q
1	0-10	2	0	2	0	0	0	0	0	0	0	0	1	0
2	0-10	2	0	5	2	0	0	0	0	3	1	0	0	0
2	10-30	5	3	15	9	7	3	3	1	9	1	0	3	0
3	0-10	1	0	2	0	0	1	0	0	5	1	2	0	0
3	10-20	0	1	2	0	0	0	0	0	0	0	2	1	0
4	0-10	7	4	7	4	1	0	0	0	0	0	3	1	0
	FS	1	1	8	4	0	0	2	0	4	0	0	1	2
	Total	18	9	41	19	8	4	5	1	21	3	7	7	2

14JF448 (Grasshopper Falls phase)

xu	Depth (cm)	T	TH	F	FH	P	PH	M	MH	R	RH	K	KH	O	OH	S	Q	QH
1	0-10	7	4	9	2	0	0	1	1	0	0	0	0	0	1	1	1	0
1	10-30	15	5	21	10	8	2	0	0	5	2	4	0	0	8	6	10	0
1	30-40	9	4	10	3	2	0	0	0	0	1	0	0	0	0	2	3	1
1	40-50	12	3	7	7	1	0	0	0	0	0	0	0	1	1	1	2	0
1	50-60	15	3	5	7	1	1	0	0	0	0	0	0	2	0	4	2	0
2	0-10	6	1	6	4	5	3	0	0	0	0	0	0	0	3	0	2	0
2	10-20	9	7	7	3	4	0	0	0	0	0	0	0	0	1	0	1	0
2	20-30	15	3	7	7	3	0	0	0	1	0	0	1	1	1	7	5	0
2	30-40	10	0	7	5	1	0	0	0	1	0	2	0	0	1	0	1	0
2	40-50	17	2	9	3	2	2	0	0	1	0	0	1	0	0	3	2	0
2	50-60	9	3	8	5	5	0	2	0	0	0	0	1	0	2	3	2	0
	Total	124	35	96	56	32	8	3	1	8	3	6	3	5	18	27	31	1

14JF449 (Grasshopper Falls phase)

xu	Depth (cm)	T	TH	F	FH	P	PH	M	R	RH	K	KH	O	OH	W	S	SH	Q
1	0-10	7	7	6	2	0	0	0	0	0	0	0	1	0	0	1	1	0
1	10-20	9	2	10	5	5	0	2	0	1	0	1	1	0	0	2	0	1
1	20-30	8	2	9	1	0	0	1	1	0	0	1	0	3	0	2	0	1
1	30-40	9	4	7	8	3	0	0	1	1	2	0	1	2	1	8	1	1
1	40-50	12	2	14	1	5	2	0	1	0	1	3	0	3	0	2	0	1
1	50-55	5	1	1	0	6	0	0	1	0	2	0	2	0	0	2	0	0
	Total	50	18	47	17	19	2	3	4	2	5	5	5	8	1	17	2	4

14JF450 (Grasshopper Falls phase)

xu	Depth (cm)	T	TH	F	FH	P	M	R	K	KH	O	OH
1	0-10	4	1	0	4	3	1	1	0	0	2	0
2	0-10	1	0	0	3	0	1	0	0	1	0	0
2	10-20	0	0	1	2	1	1	0	0	0	0	0
2	20-30	0	0	0	0	1	1	0	0	0	0	0
3	10-20	0	0	0	0	0	0	0	1	0	0	0
4	0-10	4	0	2	0	42	0	0	1	0	0	1
4	10-20	3	0	0	0	3	0	0	0	0	0	0
	ST	0	0	0	0	1	1	0	0	0	0	0
	Total	12	1	3	9	51	5	1	2	1	2	1

14JF477 (Grasshopper Falls phase)

xu	Depth (cm)	T	TH	F	FH	P	PH	M	R	OH
1	0-10	6	1	1	0	2	0	0	0	2
1	10-20	0	1	0	0	0	0	0	0	0
2	0-10	4	2	0	0	5	0	0	1	0
3	0-10	16	2	6	4	13	6	5	5	0
4	0-10	3	0	4	1	7	0	1	0	1
	ST 18	0	0	0	0	1	0	0	0	0
	Total	29	6	11	5	28	6	6	6	3

14JF482 (Grasshopper Falls phase)

xu	Depth (cm)	T	P	S
P-1		0	0	1
P-2		0	1	0
FS		1	0	0
Total		1	1	1

14JF484 (Plains Woodland)

xu	Depth (cm)	T	TH	F	FH	P	PH	M	R	RH	K	O	OH	W	S	Q	QH
1	0-20	6	4	11	5	0	0	0	0	0	0	0	0	0	1	0	0
2	0-10	12	5	10	4	2	1	1	0	0	1	1	0	0	2	0	0
2	10-20	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0-10	5	1	10	1	0	0	0	1	0	0	0	2	0	1	2	1
	FS	6	0	1	0	1	0	2	1	1	0	0	0	1	1	2	0
	Total	30	12	33	10	3	1	3	2	1	1	1	2	1	5	4	1

Appendix 4

GLOSSARY

Alibates - a distinctive purple and gray mottled chert that was favored for production of chipped stone tools throughout the prehistoric period in the Great Plains; its source is several quarry sites in the Panhandle of Texas, now preserved in the Alibates National Monument.

aplastic - as used in this report, synonymous with nonplastic; the material, whether added or naturally occurring, in the clay used in manufacturing ceramics which counteracts excessive shrinking of the vessel during drying and firing.

Aquic Argiudoll - A U.S.D.A. soil taxonomic classification for a grassland soil that has a surface horizon dark in color due to relatively high organic matter content, a modest concentration of translocated silicate clays, and a saturated state year around.

argillic - a mineral soil horizon characterized by the illuvial (see illuviation below) accumulation of layer-lattice silicate clays.

artifact - any object manufactured or modified by man.

assemblage - all the industries, or a particular type of industry, at one site.

biome - the largest, most conveniently recognized land community unit, formed by the interaction of regional climates, biota and substrate.

calibration - an adjustment of the radiocarbon dating "clock" that accounts for the variation in the amount of C-14 in the atmosphere through time.

Chloridoids - abbreviation of Chloridoideae, a subfamily of grasses adapted to areas with warm temperatures where available soil moisture is low.

community - An ecological concept which defines a biological assemblage with unity of taxonomic composition and a relatively uniform appearance.

complex - refers to an archaeological manifestation without being committal to any particular taxonomic designation, such as a focus or phase.

component - the manifestation of a given archaeological complex at a specific site.

crotovina - also spelled krotovina, a former animal burrow in one soil horizon that has been filled with organic matter or material from another horizon.

culture - similar assemblages found at several sites, defined in a context of time and space.

Cumulic Haplustoll - A U.S.D.A. soil taxonomic classification for a grassland soil that has a surface horizon dark in color due to relatively high organic matter content, an accumulation of mineral material by air or water on the surface as the soil develops, a relatively simple sequence of soil horizons, and is dry for at least 90 days per year.

datum - a reference point on an archaeological site, normally surveyed onto a large-scale map, and used as a base point for all measurements on the site.

debitage - the waste material (chips and flakes) generated by the production of chipped-stone tools.

Delisle maps - refers to the maps produced by Guillaume De l'Isle (generally spelled Delisle), a noted French cartographer, in 1703 (Carte du Mexique et de la Floride...) and 1718 (Carte de la Louisiane et du Cours du Mississippi...). These were the most accurate depictions of the locations of the physical features and indigenous peoples of North America during the early 18th century.

diagnostic artifact - an item representative of a particular culture or time period.

ecotone - the zone wherein two different forms of vegetable life contend for dominance; transition area between two plant communities.

feature - the location of specific activities (e.g., hearths, storage pits, petroglyphs, burials) that are recognized in the field.

flotation - water separation of heavy soils from light plant and animal remains.

fluvial - pertaining to, found in, or formed by a stream.

focus - from the old Midwestern (or McKern) Taxonomic System of archaeological complexes; approximately equivalent to a phase in the Willey and Phillips system.

fusulinids - small, marine invertebrate organisms that were abundant during Pennsylvanian and Permian time; they occur as wheat grain-shaped fossils in some cherts within the limestone members dating to those periods.

ground truthing - verification of remotely sensed information by means of direct observation or measurement on the Earth's surface.

Holocene - the recent epoch of the Quaternary era; the last 10,000 years of geologic time.

illuviation - the process, mechanical or chemical, by which material is added to the topsoil of an area.

industry - all artifacts of one particular kind (viz., bone, stone, or ceramic) found at one site, made at the same time, by the same population.

interfluve - the high land between two streams belonging to the same drainage system.

lithic - stone, either ground stone or chipped stone.

macrofloral - all plant remains that can be seen with the unaided eye but that are usually identified with a microscope.

megafauna - as used in this report, a general term embracing all large mammals (e.g., mammoth, mastodon, bison,) of the Pleistocene epoch.

mesic - an environment with sufficient moisture during the year to meet evaporation and transpiration requirements.

Mollic epipedon - a surface horizon of mineral soil that is dark colored and relatively thick, contains at least 0.58% organic carbon, is not massive and hard or very hard when dry, has a base saturation of more than 50% when measured at pH 7, has less than 250 ppm of P_2O_5 soluble in 1% citric acid, and is dominantly saturated with bivalent cations.

montane - pertaining to living in the mountains; said especially of plants and animals.

montmorillonite - a type of clay mmineral which is expansible, i.e., has a tendency to undergo significant shrink and swell upon drying and wetting, respectively.

Munsell colors - a designation of color by the use of three variables: hue (relation to red, yellow, green, blue, and purple), value (lightness), and chroma (strength).

opal phytolith - dissolved silica absorbed by the root system of plants and precipitated into solid silica, or opal, with characteristic shapes.

paleosol - a buried soil horizon; indicative of a prior period of surface stability and soil development.

Panicoids - abbreviation of Panicoideae, a subfamily of grasses that thrive in warm temperatures and high available soil moisture.

pedogenesis - initial soil formation.

ped surface - the exterior of a unit of soil structure such as an aggregate, crumb, prism, block or granule, formed by natural processes (in contrast with a clod, which is formed artificially).

pedoturbation - the process of mixing in the soil; it can be due to animals, plants, freeze-thaw cycles, movements of expansible clays, gas movement, water movement, crystal growth, and vibration (e.g., earthquake).

penecontemporaneous - almost at the same time.

phase - An archaeological unit possessing traits sufficiently characteristic to distinguish it from all other units similarly conceived, whether of the same or other cultures or civilizations, spatially limited to the order of magnitude of a locality or region and chronologically limited to a relatively brief interval of time (Willey and Phillips 1958:22)

pipette method - a laboratory technique whereby particle-size distribution is determined through precisely timed withdrawals of sediment suspended in still water; the procedure is based upon the relationship between size and the rate of settling for various particles.

Pleistocene - the geologic epoch that preceeded the Holocene which, together with it, forms the Quaternary era; a time of periodic glacial advance.

Pooids - abbreviation of Pooideae, a subfamily of grasses that thrive in cool temperatures and high available soil moisture.

profile - a schematic drawing representing the stratigraphy of an excavation unit or backhoe trench.

Quaternary era - the last great subdivision of geological time, of which the Pleistocene is a part.

relict - left by gradual erosion; residual.

seriation - ordering.

site - any locus of human activity.

stochastic - used in this case to denote change which is not determined by materialistic factors, but is attributable to more indeterminable, random motives.

stratigraphy - the spatial arrangement of soils and/or sediments with the younger deposits superimposed on the older.

taphonomy - as used in this sense, the study of natural or cultural disturbance processes that affect archaeological deposits.

temper - the aplastic additive in the paste used in the manufacture of pottery that aids uniform drying and prevents cracking.

toposequence - the systematic relationship of soil characteristics to their position in the landscape; soil drainage is one of the more obvious ones, i.e., the higher in the landscape a soil is, usually the better its drainage.

tracheids - elongated, thick-walled conducting and supporting cells of xylem with tapering ends and pitted walls without true perforations. Found in nearly all vascular plants.

Typic Argiudoll - A U.S.D.A. soil taxonomic classification for a grassland soil that has a surface horizon dark in color due to relatively high organic matter content, a modest concentration of translocated silicate clays, and is dry for less than 90 days out of the year.

Typic Udipsamment - A U.S.D.A. soil taxonomic classification for a soil of slight and recent development, a texture of loamy fine sand or coarser, and relatively good drainage.

unit - the basic test pit excavated during the project, it measures $1m^2$.

Vertic Hapluaquoll - A U.S.D.A. soil taxonomic classification for a grassland soil that has a surface horizon dark in color due to relatively high organic matter content, a tendency for mixing due to significant expansible clay content, relatively simple horizon development, and moisture year around.

Wisconsinan - the last major glacial advance of the Pleistocene that occurred between about 90,000 and 10,000 years ago.

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